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Emotional intelligence as a protective factor for risk behavior in adolescence

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EMOTIONAL INTELLIGENCE AS A PROTECTIVE FACTOR FOR RISK BEHAVIOR IN ADOLESCENCE

An Abstract of a Thesis

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in Partial Fulfillment

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ABSTRACT

Emotional intelligence is a concept developed by Salovey and Mayer in 1990. Since the first published work on emotional intelligence, others have modified the original idea by adding personality-like traits to the model of emotional intelligence. Consequently, there is a split in the conceptualization of emotional intelligence and the measurement of emotional intelligence; ability model assessment and mixed or trait model self-report assessment. The ability model of emotional intelligence has stood up to tests of discriminant validity over personality traits, unlike the mixed model of emotional intelligence. It is also distinguishable from cognitive intelligence, yet correlates moderately and therefore is considered related to or a component of intelligence. Little research has used the ability model of emotional intelligence, but there is a growing body of evidence that emotional intelligence is important in the prediction of adolescent risk behavior (Mayer, Perkins, Caruso, & Salovey, 2001; Trinidad & Johnson, 2002).

Adolescent risk behavior is a popular area of interest because the leading cause of death of persons between the ages of 15 and 19 years is unintentional injuries resulting from specific behaviors (e.g., drinking and driving, unprotected sexual intercourse, speeding).

The current study adds to the growing body of research that uses ability model emotional intelligence tests through a comparison of emotional intelligence scores with the Five Factor Model personality traits, self-reported risk behavior and risk perception of adolescents and young adults. Several risk behaviors were targeted, and these behaviors are of varying types: Thrill-seeking risk (e.g., roller blading, sky diving), Rebellious risk

(e.g., smoking, staying out late), Reckless risk (e.g., speeding, drinking and driving) and Anti-social risk (e.g., cheating, teasing others).

The aim of this study was to answer three important questions. First, is emotional intelligence a protective factor for risk behaviors in adolescence and early adulthood? Second, does emotional intelligence have incremental validity over the NEO-FFI in predicting risk behavior in adolescents and young adults? Finally, do older participants have higher overall emotional intelligence scores then younger participants?

Participants were 171 males and females between the ages of 15 and 24 recruited from area high schools, the UNI student population, and the local community. Each participant took the MSCEIT or MSCEIT-YV, the ARQ and the NEO-FFI. The findings of the present study suggest that emotional intelligence is related to risk behavior in high school students. However, in college students, the present results indicate that emotional intelligence is related to risk perception, but not to risk behavior. As expected, thrill-seeking behavior was not related to emotional intelligence. Our data show that emotional intelligence provides incremental validity over personality factors in the prediction of risk behavior in high school students and provides incremental validity over personality in the prediction of risk beliefs in college students. We found a small indication of a developmental trend in the college students and a strong trend in the opposite direction from what was expected in the high school participants, which suggests that emotional intelligence may not increase with age.

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CHAPTER 1

EMOTIONAL INTELLIGENCE

History of Emotional Intelligence

Since the inception of intelligence tests by Sir Francis Galton in the late 19th century, there has been controversy surrounding the concept of intelligence (Sattler, 2001). Theories put forth have varied from Spearman's one general intelligence factor to those of multiple intelligences (Sattler, 2001). Even though it is widely accepted that intelligence constitutes abilities in the verbal and spatial/performance domains (Sattler, 2001), there is still some room for argument. Thorndike (1920) was the first to suggest the idea of social intelligence. Later the Educational Testing Service (ETS) marketed a kit that measured dozens of intelligences (Ekstrom, French, Harman, & Dermen, 1976). Analysis of these intelligences revealed three main subgroups of intelligence: verbal intelligence, spatial-performance intelligence, and social intelligence (Mayer & Salovey, 1997). In 1960, Cronbach stated that social intelligence was very similar to the other two intelligences and therefore not a feasible construct. Even in the wake of Cronbach's cynicism, others have since postulated various types of intelligence similar to that of Thorndike's social intelligence. Gardner (1983) is well known for his theory of multiple intelligences that includes interpersonal and intrapersonal intelligences. Sternberg has written several papers that promote his theory of practical intelligence (Sternberg & Caruso, 1985; Wagner & Sternberg, 1985), which, along with analytical and creative intelligences, is part of Sternberg's triarchic theory of intelligence (Sattler, 2001). However, these ideas have not entered the field of psychology without controversy.

Ability Model of Emotional Intelligence

Salovey and Mayer (1990) contributed a controversial supplement to the concept of intelligence in their work *Emotional Intelligence*. They defined emotional intelligence as the ability to perceive one's own and others' emotions, to manage these emotions and to use this information to guide thinking and decision making. Drawing on Gardner's multiple intelligence theory and the theory of social intelligence, Salovey and Mayer (1990) formulated the construct of emotional intelligence. They examined past research on emotion and intelligence and found concepts that were quite compatible. However, they felt the research was separated across a variety of books and journals and various schools of psychology. They integrated research in the areas of emotion, alexithymia (inability to describe one's emotions), empathy, and intelligence to conceptualize their hierarchical/ developmental model of emotional intelligence.

Emotional intelligence was initially theorized as a three-factor model that consists of expression of emotions, regulation of emotion, and utilization of emotion in decision-making (Salovey & Mayer, 1990). Since then, it has undergone revision to include thinking about emotion. Mayer and Salovey (1997) now conceive of a general emotional intelligence that can be broken down into four parts: perception, facilitation, utilization, and regulation. This is a developmental model with the lowest branch being perception of emotion and emotional content in oneself and others; and the accurate expression of emotion.

The next branch in the developmental model of emotional intelligence is the use of emotional content to facilitate thinking or assimilating emotion into the thought

process. Now that the person has developed the ability to recognize and express emotions, he/she can use this information to aid in decision-making. Emotions can serve as an "alert system" by directing one's thoughts towards necessity (Salovey & Mayer, 1997, pg. 12). For example, the fear of getting in trouble with the law may help prevent a teenager from drinking alcohol at a graduation party. In addition, facilitation also encompasses the ability to generate emotions on demand. A teenager may use this ability to envision the embarrassment of getting in trouble and frustration of the consequences of her actions. She can then make a decision based on generated emotional information. The more vivid the feelings, the more likely she is to abstain from the behavior. Conversely, these abilities may allow adolescents to conjure emotions related to ridicule from peers, which may consequently drive the adolescent to participate in negative behavior. The next branches of emotional intelligence represent abilities of higher development that will aid in the understanding and management of emotional information.

The third branch of emotional intelligence is the ability to better understand how emotions influence thought. People are able to distinguish the subtleties of emotions; for example, the difference between like and love or frustration and anger. At this stage, individuals are able to understand and deal with contradictory emotions. The feelings of anger evoked by a loved one become understandable. The ability to understand attachment of emotions to particular life events also becomes solidified at this level (Mayer & Salovey, 1997).

The fourth branch, and highest level, of emotional intelligence is regulation of emotion. This is the ability to remain open to pleasant and unpleasant emotions and use emotional information to enhance intellectual growth. At this stage a person learns that emotions can be felt without the need to act on them and becomes aware that emotions can influence thought and problem solving. For example, if a woman gets in a car accident on the way to work and is feeling angry, she can put a smile on her face as she walks into work. She knows that if she looks or acts angry, her customers will not tip as much as she would like (Mayer & Salovey, 1997).

Mayer, Caruso, and Salovey (2000) believe emotional intelligence is in its purest form when considered an intelligence and have questioned the many modifications of their original concept. They write, "If emotional intelligence does not refer exclusively to emotion or intelligence, then it becomes quite unclear to what it does refer" (pg. 103). They laid out three criteria for a construct to be considered an intelligence: it must be a mental ability rather than a preferred behavior; any new intelligence should be similar to, but distinct from, established intelligences (e.g. verbal intelligence); and lastly, it should develop with age and experience. These criteria were adapted from past research by Carroll (1993), Neisser et al. (1996), and Simon and Binet (as reviewed by Francher, 1985). Emotional intelligence (as measured by an ability model assessment) was found to adhere to each of these essential criteria. The ability model of emotional intelligence is founded on the idea that emotional intelligence is a series of skills or abilities gained throughout development, and the Multifactor Emotional Intelligence Scale (MEIS) was developed based on this model. The MEIS is comprised of several tasks in which a

person solves emotional related problems in order to test the ability to perceive emotion, use emotion in decision-making and manage emotion. Factor analysis revealed that the MEIS tested the four factors (or skills) originally theorized; and therefore, can be considered a mental ability as the test developers had intended (Mayer, et al., 2000). Scores on the MEIS were higher for adults than for adolescents, which is in accordance with the second criteria for establishment of an intelligence. Thirdly, emotional intelligence was found to correlate with verbal intelligence at a low-moderate level ($r = 0.36$, $p < 0.01$). This correlation with cognitive intelligence is important. Significant moderate correlations (e.g., 0.40 to 0.60) suggest similar constructs, whereas insignificant, small correlations suggest different or less related constructs (Kazdin, 1998). For example, verbal and performance intelligence, as measured by the Wechsler Adult Intelligence Scale, correlate highly ($r = 0.75$), which indicates that the constructs are related (Wechsler, 1997). On the other hand, personality traits and cognitive intelligence correlate minimally (Nobo & Evans, 1986; Parker, Hanson, & Hunsley, 1989), which suggests they are different constructs.

Mixed Model Emotional Intelligence

Salovey and Mayer's ability model is quite complex and rather different than the more popularized mixed models of emotional intelligence. Daniel Goleman most notably modified Salovey and Mayer's original concept. In his book, *Emotional Intelligence*, Goleman (1995) added motivation, persistence, and social competence to the basic structure of emotional intelligence. Bar-On (1997) also modified the original concept and characterized emotional intelligence as involving interpersonal skills, intrapersonal

skills, stress management, adaptability, and mood. These various definitions are based loosely on Salovey and Mayer's original idea, but have incorporated personality-like traits and state dispositions. These models are known as mixed-models of emotional intelligence and are normally assessed using self-report inventories similar to personality inventories.

Mixed models of emotional intelligence have yet to meet the criteria for being considered an intelligence set forth by Mayer et al. (2000). No research has been dedicated to establish the mixed-model as an intelligence, but various studies have given insight as to the potential outcome of such an inquiry. One study used factor analysis to show that self-report measures can reliably measure the four factor model proposed by Salovey and Mayer (this study used the Schutte EI Scale, 1998), but also found that emotional intelligence was highly correlated with the five factors of the NEO-PI-Revised and with alexithymia (Saklofke, Austin, & Minski, 2003). To be considered an intelligence, a construct must be at least moderately correlated to cognitive intelligence and discriminant validity shown between it and other similar measures, such as personality (Mayer, et al., 2000). This same study also found that emotional intelligence as measured through self-report did not correlate with full scale intelligence ($r = -0.05$, $p = 0.74$), verbal intelligence ($r = -0.11$, $p = 0.51$), or performance intelligence ($r = 0.02$, $p = 0.89$), which suggests that this particular self-report inventory measures something different from intelligence, namely personality.

Most of the criticisms of mixed-models of emotional intelligence have focused on their relationship to personality. If emotional intelligence as defined by these self-report

inventories is not different than the well-established personality inventories psychologists have used for years, then there is no reason to re-define personality in these more socially aesthetic terms. Many researchers have questioned the discriminant validity of self-report emotional intelligence scales as compared to personality scales. Saklofke et al. (2003) found that self-report scores on the Shutte EI Scale significantly correlated with all five factors of the NEO-PI-R ($r = 0.18 - 0.51$). The highest correlation was between emotional intelligence and Extroversion. A group in Germany used the same measures and found similar correlations between personality traits and self-reported emotional intelligence (Wolfradt, Felfe, & Koster, 2001). Newsome, Day and Catano (2000) used different measures, again with similar results. Using the 16PF (Cattell, Cattell, & Cattell, 1993) and the Bar-On Emotional Quotient Inventory (EQ-i, 1997), they found significant correlations ($r = 0.36 - 0.77$, $p < 0.05$) on all factors of the 16PF except tough-mindedness.

Although the data point to a strong relationship between self-reported emotional intelligence and personality, there is some evidence in the opposite direction. A study by Coffey, Berenbaum and Kerns (2003) reported similarities between self-reported emotional intelligence and personality, but also found that the emotion-specific content (attention to emotion and clarity of emotions) of the scales was not correlated as convincingly with personality, which suggests some discriminant validity of the emotion-specific content. Attention to emotions was not significantly correlated with neuroticism ($r = 0.02$), and clarity of emotions was not significantly correlated with extroversion ($r = -0.12$). They suggested that emotional intelligence assessment inventories might be more

useful if the emotional content was extracted from the self-report inventory and used on its own. This is precisely how Salovey and Mayer (1990) first conceptualized emotional intelligence.

Assessment of Emotional Intelligence

Self-Report Inventories

Perhaps the reason self-report inventories became so popular is because it was the format first published as an assessment instrument for emotional intelligence. The Trait Meta Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) is a self-report inventory designed after the original concept of emotional intelligence. It assessed individual differences in utilizing emotions, but did not use the term emotional intelligence. The EQ-i (Bar-On, 1997) was the first emotional intelligence instrument to be published by a psychological test publisher (Bar-On, 2000). It was developed as a self-report measurement of both emotional and social intelligence. Even though it is moderately correlated with ability tests (0.46 with overall MSCEIT score), it shows a stronger correlation with some of the factors on the 16PF: 0.72 with factor emotional stability and -0.55 with apprehension (Bar-On, 2000). In 1998, Schutte and colleagues introduced a new emotional intelligence test, the Schutte EI Scale, based on the original work of Salovey and Mayer. In their original work, Schutte et al. presented a factor analysis confirming loadings onto Salovey and Mayer's concept of emotional intelligence, presented evidence of good reliability and validity, and presented a well-developed instrument. More recently, this test has come under some scrutiny, as have all self-report measures of emotional intelligence, with regard to the factor structure and

construct validity (Petrides & Furnam, 2000). The evidence increasingly supports the concept that self-report measures of emotional intelligence may better represent personality traits than a form of intelligence.

Ability Tests

Mayer and colleagues discontinued the development of the TMMS to design an ability-based assessment of emotional intelligence. The TMMS is meant to measure a person's awareness and perception of emotional experience, which is far different from the measurement of an intelligence (Mayer, personal communication). They felt the most direct way to measure emotional intelligence was through several tasks in which a person solves emotional related problems (Mayer et al., 2000). Similar to cognitive intelligence tests where a person is asked to define vocabulary terms, solve spatial puzzles, and remember a series of digits, an emotional intelligence test should ask a person to identify emotions in faces, identify combination emotions, or judge actions that obtain a certain emotional outcome. The first of such tests was developed by Mayer et al. (2000) and called the Multifactor Emotional Intelligence Test (MEIS). It was composed of 12 subtests, which yielded an overall general emotional intelligence score and three subscale scores (perception, understanding, and management). It was found through factor analysis that two of the branches of the MEIS, assimilation and understanding, originally perceived as separate, loaded onto one factor that was termed understanding.

The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) was developed to measure the four branches of Mayer and Salovey's (1997) revised model of emotional intelligence and to address the criticisms of the MEIS with regard to consensus

scoring, reliability, and factor structure. The MSCEIT has 141 items and 8 subtests, two subtests developed to measure each of the four branches of emotional intelligence. There are two ways to score the responses: by consensus method or expert scoring method. In the consensus method, an individual's response is based on the proportion of the normative sample that gave the same answer to that question. Expert scores are based on the response of 21 members of the International Society for the Research on Emotions. Both scoring methods yield a total score, two area scores, four branch scores, and eight task scores. The two types of scores were similar ($r = 0.96 - 0.98$) across total score and branch scores, but the expert scores were found to have higher reliability. In addition, the MSCEIT was found to be highly reliable and factor analysis confirmed the fit to the four-branch model of emotional intelligence (Mayer, Salovey, Caruso, & Sitarenios, 2003). These recent findings answered the questions proposed by Roberts, Zeidner, and Matthews (2001) and show the MSCEIT to be a strong measure of ability emotional intelligence.

There are eight subtests that make up the MSCEIT. In the faces task, participants indicate to what degree a certain emotion is showing on a particular face. The pictures task is the same as the faces task, but uses photographs of art and nature as stimuli instead of faces. These two subtests load onto the perception branch of the emotional intelligence model. The sensations task and facilitation task load onto the assimilation branch. The sensations task asks the participant to match sensations to certain emotions. In the facilitation task, participants judge which emotions are most useful in facilitating a cognitive task. The changes task and blends task combine to form the understanding

branch of emotional intelligence. The blends task has participants select a number of emotions that can be combined to create a new emotion. The changes task asks the participant to identify emotions that result from the amplification of another emotion. The last two tests make up the regulating emotions branch. The emotion management task asks participants to judge what a character might do to obtain a specified emotional outcome. Lastly, in the emotional relationships task, participants identify the actions that will best manage another person's emotions.

The MEIS and the MSCEIT were developed for testing adults. An adolescent measure of ability emotional intelligence, the MEIS-A was subsequently created. The factor structure proposed for the MEIS is the same for the MEIS-A. In addition to the revision of the MEIS published as the MSCEIT, there is a youth version called the MSCEIT-YV that is currently available in research-only format.

There are only a few studies that compare self-report inventories with ability tests of emotional intelligence. As described earlier, Bar-On (2000) reported a moderate correlation between the EQ-i and the MSCEIT ($r = 0.44$). Brackett and Mayer (2003) reported a correlation of 0.21 between the MSCEIT total score and the EQ-i total score and a correlation of 0.18 between the total scores of the MSCEIT and the Schutte EI Scale. The conclusion from these studies is that self-report scales and ability tests measure slightly different constructs. As reported by Coffey, Berenbaum and Kerns (2003), self-report inventories do tap into emotional content, as shown by the low to moderate correlations with an ability test. Brackett and Mayer (2003) reported scattered low correlations between the various scales of the EQ-i and MSCEIT. The intrapersonal

scale of the EQ-i was not significantly correlated to any of the MSCEIT scales. The interpersonal scale showed low to moderate correlations with perception, facilitation, and regulation (r = 0.20, 0.15, 0.40 respectively), but no correlation with the understanding scale of the MSCEIT. Adaptability of the EQ-i correlated only with regulation (r = 0.18), General Mood correlated only with regulation (r = 0.19), and Self-management did not correlate with any of the four MSCEIT scales. Even though self-report inventories, like the EQ-i, claim to measure emotional intelligence, they at least seem to measure something different than emotional intelligence as put forth by Mayer and Salovey (1997). Perhaps separate definitions are needed to describe constructs measured by self-report inventories and those measured by ability type assessments.

Correlational Research in Emotional Intelligence

Much of the research in emotional intelligence was conducted with self-report scales. Self-report measures tend to correlate quite highly with personality measures (Newsome et al., 2000; Saklofke et al., 2003; Wolfradt et al., 2001). A recent study by Caruso, Mayer and Salovey (2002) looked at the relationship between the MEIS and the 16PF, a self-report inventory that measures 16 factors of personality (Cattell et al., 1993). They found the MEIS total and branch scores were not related to the scores generated on the 16PF. Analyses revealed some of the correlations to be significant, but they were scattered. The largest significant correlation was between scores on the management of emotions branch and the self-reliance scale of the 16PF (r = -0.25). A comparison of the EQ-i and 16PF revealed higher significant correlations (0.72 with emotional stability and -0.55 with apprehension; Bar-On, 2000).

Self-report measures of emotional intelligence are correlated with leadership (Goleman, 1998), job performance (Dulewicz, Higgs, & Slaski, 2003), mood and self-esteem (Schutte, Malouff, Simunek, McKenley, & Hollander 2002), and career decision-making (Brown, George-Curran, & Smith, 2003). A study with adolescents found self-report emotional intelligence was related to social support and parental warmth (Ciarrochi, Chan, & Bajgar, 2001). Moriarty, Stough, Tismarsh. Eger, & Dennison (2001) attempted to measure emotional intelligence ability as conceived by Mayer and Salovey (1997) with a battery of self-report inventories. Adolescent sex offenders were given the TMMS (Salovey et al., 1995), The Toronto Alexithymia Scale (TAS-R; Bagby, Taylor, & Parker, 1994), The Inventory of Interpersonal Problems (IIP-32; Barkham, Hardy, & Startup, 1996), and the Interpersonal Reactivity Index (IRI; Davis, 1983). The combination of these tests was expected to test perceiving emotion, understanding emotion and managing emotion branches of Salovey and Mayer's model of emotional intelligence. The psychometric analysis of the battery of tests found three factors: clarity of feelings, aggression, and difficulty in identification of feelings. These three factors fit into the emotional intelligence model at branch one only, emotional perception and expression. This analysis also found less than optimal reliability in this mode of prediction. The results of the study found that sex offenders had higher aggression measured by the IIP-32 and lower emotional understanding as measured by the TMMS. Although the theoretical results are interesting, the greater impact of the analysis is shown in the psychometric data. This research suggests that ability model emotional intelligence cannot be reliably and validly tested using a battery of self-report inventories.

A different approach to the measurement of emotional intelligence ability was taken by Batastini (2001) to study the relationship between emotional intelligence, student leadership, and creativity. In her dissertation, she developed a self-report measure of emotional intelligence based on the original three-branch model of emotional intelligence (Salovey & Mayer, 1990). It consisted of 24 statements that asked students to best describe themselves. She also examined student essays as a qualitative measure of emotional intelligence and took guidance from the three-branch model. Her rationale for the use of these methods of emotional intelligence assessment was that there was no published ability scale for use with adolescents at that time. She added the qualitative measure to strengthen emotional intelligence scores on the self-report scale. The study reported limited reliability and validity of the newly developed emotional intelligence scale, but qualitative analysis of the student essays showed agreement between two independent raters. It is not known whether either analysis adequately measured Salovey and Mayer's concept of emotional intelligence. Results of the study indicated that a relationship exists between emotional intelligence and student leadership ($r = .62$, $p < 0.05$) and emotional intelligence and creativity in adolescents.

The research with genuine ability tests is less comprehensive. A study by Mayer, Perkins, Caruso, and Salovey (2001) investigated emotional intelligence, verbal intelligence and the responses to difficult social situations. The students described a recent social situation in which friends asked them to do something they felt uncomfortable doing. In addition to questions about the specific situation, each student took the MEIS-A and the Peabody Picture Vocabulary test (PPVT; Dunn & Dunn, 1981).

The results suggested that students with high emotional intelligence were better able to stand up to others who pressured them to participate in behaviors with which the students felt uncomfortable and thought were wrong or destructive. It is also worth noting that two students with similar verbal intelligence scores had emotional intelligence scores more than two standard deviations apart. The student with the higher emotional intelligence was able to stand up to her peers' requests, whereas the student with lower emotional intelligence did as his friends asked even though he felt the action was wrong.

Research on emotional intelligence and incidence of tobacco and alcohol use found that emotional intelligence accounts for a small portion of the variance in tobacco and alcohol use (Trinidad & Johnson, 2002). To measure emotional intelligence they used the MEIS-A. Tobacco and alcohol use was assessed with the items from the Independent Evaluation Consortium of the California Tobacco Control and Education Program (Independent Evaluation Consortium, 1998). The results suggested that students with high emotional intelligence may be better equipped to ward off peer pressure and have a greater ability to resist the use of tobacco and alcohol.

CHAPTER 2

ADOLESCENT RISK BEHAVIOR

Definitions of Risk Behavior

Irwin's (1993) definition of risk behaviors includes behaviors for which there are unknown consequences and the potential for those consequences to have a negative health outcome. Yates (1992) believed risk is multi-dimensional and his definition included a consideration of the potential loss, the probability of loss, and the significance of the potential loss. These definitions take into account only the negative consequences of risk, but do not encompass the risks that may also have positive outcomes, such as asking someone on a date or attempting a physical challenge. An extended definition of risk includes weighing both the negative and positive outcomes of the behavior; this allows one to test maladaptive behaviors with potential negative health outcomes and adaptive behaviors with potential for psychological and physical growth (Moore & Gullone, 1996). Asking someone for a date involves the potential for a positive outcome of a date and a negative outcome of rejection. If the person feels the positive outcome overrides the negative, that person is more likely to take the risk.

Adolescent Risk Behavior Theory Development

Adolescent risk behavior is a popular area of interest because the leading cause of death of this age group is unintentional injuries that result from specific behaviors. Unintentional injuries, homicide and suicide account for 75 percent of deaths for those 15–19 years of age and 72 percent of deaths for those 20–24 years of age (National Center for Health Statistics, 2003). The behaviors that cause such marked increase in

morbidity begin in early adolescence and increase throughout the adolescent age span. This trend is seen for all socio-economic groups and all race/ethnic groups (Irwin & Vaughan, 1988).

Risk behavior has been studied extensively and yet there is no accepted theory for understanding the nature of risk behavior in adolescence. Risk behavior has been considered a result of the biochemical process (Udry, 1988), a learned behavior (Jessor & Jessor, 1977), a developmental experience (Yates, 1992), a personality trait (Zuckerman, 1979), and a biopsychosocial combination of the four (Jessor, 1992). Jessor and Jessor (1977) originally conceived of risk behaviors as behaviors learned from the adolescent's environment, which includes family structure and parent-child interactions. Zuckerman (1979, 1994) developed a scale for sensation seeking and found sensation seeking to be related to risk taking behavior in adolescence. Sensation seeking was found to peak during the adolescent years and therefore is considered an antecedent to participation in risk behavior.

The developmental model takes a different approach to risk behavior in adolescence. Udry (1988) proposed a risk-taking model for males based on the increased levels of testosterone in the pubescent male chemistry. Increases in testosterone and other androgenic steroids were linked to increased risk behavior in males. There was no evidence of a biological effect in girls. Yates (1992) believed risk behaviors arise out of poor decision-making ability inherent in youth. Developmentalists view risk taking as normal exploratory behavior, but the behaviors have a negative outcome when inexperience leads to errors in judgment (Udry, 1988; Yates, 1992).

Jessor (1992) revised his original conception to adopt a more biopsychosocial model of adolescent risk behavior. He believed that a mixture of genetics, social environment, perceived environment, personality and overt behaviors lead to risk behaviors. In addition to the risk factors of each of these components, there are protective factors. Protective factors are important because they can buffer a vulnerable adolescent against participation in risky behavior. If the risk factors (e.g., family discord) outweigh the protective factors (e.g., quality schooling), then negative risk behaviors are more likely to appear. This more recent model of risk taking considers learned behaviors, developmental concerns (including chemical changes during puberty) and personality traits in the participation in risky behavior.

Adolescent Risk Behavior and Personality

Sensation seeking is a personality trait that was first examined by Zuckerman (1979) in his development of a sensation seeking scale. He defined sensation seeking as the need for novel experiences and the willingness to take certain risks to obtain such experiences. Many researchers have found links between sensation seeking and various risk behaviors in adolescents (Arnett, 1992, 1996; Greene, Kramar, Walters, Rubin, & Hale, 2000; Zuckerman & Neeb, 1980). High sensation seeking in adolescence explained a 7 percent variance in risky sexual behavior (Gillis, Meyer-Baulburg, & Exner, 1992) and high sensation seekers are up to seven times more likely to report alcohol use than low sensation seekers (Donohew, Palmgreen, & Lorch, 1994).

The research is quite conclusive that sensation seeking is highly associated with adolescent risk behaviors, but some view the two as being too similar to define separate

constructs. Sheer and Cline (1994) contended that, "Because the predisposition for risk-taking results from a preference for arousing stimuli, risk-taking is synonymous with sensation seeking" (p. 282). Arnett and Balle-Jensen (1993) pointed out that some of the items on the sensation seeking inventories ask specifically about risk behaviors and do not measure a personality trait.

Risk behaviors were also linked to locus of control (Werner, 1986) and self esteem (Gerrard, Gibbons, Reis-Bergan, & Russell, 2000). These investigations examine one specific personality measure that is usually compared to one or two specific risk behaviors. To gain a more global understanding of the relationship between personality traits and risk behaviors, not only do several personality traits need to be examined simultaneously, but also more global personality assessment tools may be needed. Goldberg (1993) discussed the merits of the Five Factor Model (FFM) of personality. Costa and McCrae (1992) developed the NEO-PI, NEO-FFI, and other personality inventories based on the FFM. The FFM, as measured by the NEO-PI, is stable after the age of 30, is similar across different cultures, and is stable across other environmental differences such as socioeconomic status, race and health (McCrae & Costa, 1997). This is strong evidence in support of the FFM as a basic foundation for personality.

To date, there is just one published study that investigates the FFM and risk behavior in adolescents. Moore and Gullone (1996) used the NEO-FFI and the Adolescent Risk Taking Questionnaire (ARQ, Gullone & Moore, 2000) and found that risk behaviors are related to extroversion, agreeableness and conscientiousness. Specifically, they found a lower prevalence of risk behavior in adolescents who perceived

the behavior as highly risky and found that high levels of conscientiousness and low levels of agreeableness predicted rebellious and reckless risk behavior. Extroversion was predictive of only thrill seeking behavior.

Limitations of Current Research

A great deal of the research in this area has focused on a single risk behavior such as smoking or unprotected sexual intercourse. This is a limitation because it does not show the interactions of different types of risk behaviors (Gullone & Moore, 2000; Moore & Parsons, 2000). In addition, most of the current research has focused on negative risk behavior, and does not consider the relationship of negative risks with risk behaviors that are more socially accepted, such as skydiving. Chassin, Pearson, and Sherman (1989) found that substance-abusing adolescents were more likely to be creative, assertive and independent than their peers who did not abuse substances. Some developmental researchers have found that risk-taking is not only normal in adolescence, but also psychologically adaptive (Shedler & Block, 1990). Adolescents who experimented with drugs (but were not frequent users) had better social skills and were less anxious than those adolescents who refrained from drug experimentation.

Another limitation of the current research is that adolescents between 11 and 18 years of age were used as the target samples. Very few studies have examined risk behaviors of young adults. Yet, each year the national statistics find that the accident mortality rates remain high through the early twenties. Arnett (1996) found that the prevalence for several types of reckless behavior was higher for college students than high school students. Although the prevalence of driving over 80 mph, racing a car, use

of illegal drugs, and vandalism remained similar between the two groups, the prevalence of driving while intoxicated, sex without contraception, sex with someone known only casually, and marijuana use was significantly higher for the college students. Irwin (1993) also emphasized the need to study older adolescents and young adults. He found that national mortality rate increases 214% from early adolescence (age 10-14) to late adolescence (age 15-19). This is the largest percent increase in mortality between any consecutive age group. The increase in mortality rate was linked to intentional and unintentional injuries from risky behaviors such as dangerous driving and self-harm.

Even though it may seem quite clear to researchers which behaviors are defined as risky, some suggest that adolescent perceptions of risk are different from that of an adult. In their development of a risk behavior questionnaire, Alexander, Kim, Ensminger, Johnson, Smith, and Dolan (1990) based their items on adolescent report of risky behavior. They suggested that, "risk taking may best be defined within the adolescent's own social context" (pg. 560). Gullone and Moore (2000) found that older adolescents believed most behaviors to be less risky than younger adolescents. The perception of less risk by older adolescents was associated with an increased prevalence for engagement in risk behaviors. Yates and Stone (1992) also acknowledge that risk is a subjective construct and is only meaningful in the eyes of the person taking the risk.

CHAPTER 3

STATEMENT OF PURPOSE

Emotional intelligence is a relatively new concept developed by Salovey and Mayer in 1990. Since the first published work on emotional intelligence, others have modified the original concept by adding personality-like traits to the model of emotional intelligence. Consequently, there is a split in the conceptualization of emotional intelligence and the measurement of emotional intelligence; ability model assessment and mixed or trait model self-report assessment. The ability model of emotional intelligence has stood up to the tests of discriminant validity over personality traits, unlike the mixed model of emotional intelligence. It is also distinguishable from cognitive intelligence, yet correlates moderately and so is considered related or as a component of intelligence. Few studies have been conducted using the ability model of emotional intelligence, but there is a growing body of evidence that emotional intelligence is important in predicting adolescent behaviors (Mayer et al., 2001; Trinidad & Johnson, 2002).

Adolescent risk behavior is a popular area of interest because the leading cause of death of persons between the ages of 15 and 19 years is unintentional injuries resulting from specific behaviors (e.g., drinking and driving, unprotected sexual intercourse, speeding). Irwin's (1993) definition of risk includes behaviors for which there are unknown consequences and the potential for those consequences to have a negative health outcome. Gullone and Moore (2000) added the notion of weighing potential positive and negative outcomes of the particular behavior. This allows a more inclusive

definition covering both positive (e.g., trying a new sport) and negative (e.g., smoking) risk behaviors.

Several limitations exist in the current body of research in emotional intelligence and adolescent risk behavior. Little research is reported using the ability model emotional intelligence tests. The tests are even more recent than the concept of emotional intelligence itself and warrant more research. There is a need to better explain the importance of emotional intelligence in daily living, and better distinguish emotional intelligence tests from personality tests. There is an abundance of research in adolescent risk behavior and personality, but that research is fragmented and needs revision. Past research has focused on a single risk behavior, has overlooked young adults (age 19-21) who have similar mortality rates to younger adolescents, and has used adult definitions of risk rather than risk defined by the adolescents themselves. In addition, only one study has been conducted to date using the popular Five Factor Model in studying the relationship between personality and adolescent risk behavior.

Due to the current limitations in the research, the current study will add to the growing body of research using ability model emotional intelligence tests by comparing emotional intelligence scores with the Five Factor Model personality traits, self-reported risk behavior and risk perception of adolescents and young adults. Several risk behaviors will be targeted, and these behaviors will be of varying types: Thrill-seeking risk (e.g., roller blading, sky diving), Rebellious risk (e.g., smoking, staying out late), Reckless risk (e.g., speeding, drinking and driving) and Anti-social risk (e.g., cheating, teasing others).

CHAPTER 4

HYPOTHESES

1. The ARQ, MSCEIT, MSCEIT-YV and MSCEIT will have acceptable reliability in the study sample.
2. Risk belief scores on the ARQ will be inversely correlated with risk behavior scores on the ARQ.
3. College students will endorse a higher score on the risk behavior questionnaire than high school students.
4. Adolescents with high emotional intelligence will be less likely to engage in Rebellious risk, Reckless risk, and Anti-social risk behaviors, but equally likely to participate in Thrill seeking behaviors as those with low emotional intelligence.
5. Older participants will have higher overall emotional intelligence scores than younger participants on the MSCEIT and MSCEIT -YV. The emotional intelligence structure is based on development and therefore, young adults will have developed more emotional abilities than adolescents.
6. Emotional intelligence will have incremental validity over the NEO-FFI in the prediction of risk behavior in adolescents.

CHAPTER 5

METHOD

Participants

Participants were 171 students (53 males and 118 females) between the ages of 15 and 24 (M = 18.14, SD = 2.3) recruited from two Midwestern high schools and from the population of undergraduate and graduate psychology students at a small Midwestern university. Table 1 shows the age stratification in the participant sample. Over 95% of the participants were Caucasian. Participants had an average of 11.8 years of education (Range = 9 - 17, SD = 2.1) and an average cumulative GPA of 3.29 (Range = 1.20 – 4.00, SD = 0.56). The college participants were between the ages of 18 and 24 (M = 19.6, SD = 1.5) with a mean cumulative GPA of 3.3 (Range = 2.2 – 4.0, SD = 0.5) and mean education of 13.1 years (Range = 12 – 17, SD = 1.2). The high school participants were between the ages of 15 and 18 (M = 16.1, SD = 1.1) with a mean cumulative GPA of 3.3 (Range = 1.2 – 4.0, SD = 0.6) and mean education of 9.8 years (Range = 9 – 11, SD = 0.8).

Table 1

Stratification of the Participant Sample

Age	Frequency	Percent
15	26	15.2
16	19	11.1
17	14	8.2
18	59	34.5
19	12	7
20	7	4.1
21	7	4.1
22	2	1.2
23	2	1.2
24	2	1.2

In order to recruit high school participants for the research study, the researcher went to the high schools two weeks prior to the test date to talk to the students and teachers about the project and answer questions. At that time, parental consent forms were given to the students who wished to participate in the project. The high school students were strictly volunteer participants, as they did not receive compensation for their participation. Graduate and undergraduate college students were recruited through an online system that allows students to choose projects in which they would like to participate. College students were given course credit for their participation.

Procedure

Informed consent was obtained from each participant. Parental consent was obtained from those participants younger than age 18. Once consent was obtained, participants took part in one 60-minute testing session. Participants were given basic instructions on how to fill out the questionnaires and reminded that their responses on the

forms were confidential. The emotional intelligence measure (MSCEIT or MSCEIT-YV), the NEO Five Factor Index (NEO-FFI) and the Adolescent Risk-taking Questionnaire (ARQ) were given in group format with each group containing no more than 20 participants to allow the examiner time to efficiently answer individual questions. The order in which participants took each test was not counterbalanced.

Measures

Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)

The MSCEIT is an emotional intelligence assessment based on the ability model of emotional intelligence, and is described in detail in the previous text. It is a series of eight subtests (141 items) and is available for the assessment of individuals ages 18 and older. The test gives an overall score of emotional intelligence, two area scores, four branch scores (based on the four factor model of emotional intelligence), and subtest scores. The MSCEIT general score split-half reliability is 0.93 for consensus scoring and 0.91 for expert scoring. The area scores (Experiential and Strategic) spilt-half reliabilities are both .90 for consensus scoring and are 0.88 and 0.86 respectively for expert scoring. The four branch score reliabilities range from 0.76-0.91 for consensus and expert scoring. The subtest reliabilities range from 0.55-0.88 for consensus and expert scoring (Mayer et al., 2003). Split half reliabilities are reported for the MSCEIT due to item heterogeneity and each branch of the test is comprised of two different subtests (Lopes, Salovey, & Straus, 2003; Mayer, Salovey, & Caruso, 2002).

Mayer-Salovey-Caruso Emotional Intelligence Test –Youth Version (MSCEIT-YV)

The MSCEIT-YV is an emotional intelligence assessment for ages 14-17 based on the ability model of emotional intelligence. It is very similar to the adult version, the MSCEIT. It is a series of eight subtests (184 items) that is currently available as a research-only instrument. The publishing company is in the process of normative data collection across the country that will result in the creation of standard scores and the consensus scoring option for the test. The test gives a total score of emotional intelligence, two area scores, and four branch scores (based on the four factor model of emotional intelligence). There are currently no published reliability or validity data for this instrument; and therefore, this study will calculate internal consistency and split half reliabilities and measure predictive validity and construct validity (with respect to the developmental aspect of the theory) of the MSCEIT-YV.

Adolescent Risk Behavior Questionnaire (ARQ)

The ARQ is a comprehensive risk-taking questionnaire designed for use with adolescents. It assesses socially acceptable risks as well as more socially unacceptable risks. It has two parts that are scored separately: (1) a 22-item behavior questionnaire that evaluates the incidence of risky behaviors and (2) a 22-item risk beliefs questionnaire that evaluates the adolescent's perception of risk involved with each behavior. Each questionnaire is based on a five point Likert Scale. A total score and four factor scores are calculated from each questionnaire. The four factor scores are: Thrill-seeking risk (e.g., roller blading, sky diving), Rebellious risk (e.g., smoking, staying out late), Reckless risk (e.g., speeding, drinking and driving) and Anti-social risk (e.g., cheating,

teasing others). Reliability is reported as above 0.8 for all but the anti-social factor of which the reliability ranged from 0.66-0.79 depending on age and gender.

NEO Five Factor Index (NEO-FFI)

This is a 60-item questionnaire that measures the five-factor model of personality (neuroticism, openness, extroversion, agreeability, and conscientiousness). Each item is based on a five point Likert Scale and respondents are asked to make a rating based on what is most true for them. High scores on the test represent high levels of the particular trait. Internal consistency ranged from 0.68 for Agreeableness to 0.86 for Neuroticism. Test-retest reliability ranged from 0.75 - 0.83. Correlations with the NEO-PI-R ranged from 0.77 for Agreeableness to 0.92 for Neuroticism.

Data Analysis

There are two methods to score the emotional intelligence tests: consensus scoring and expert scoring. The expert scoring method was used to score the MSCEIT and MSCEIT-YV. This method was chosen because the MSCEIT-YV does not yet have a normative group available for consensus scoring and both versions of the tests needed to be scored using the same method. The MSCEIT was scored with an online scoring program developed by the test publisher. The research data set created by the program calculated a standard score with a mean of 100 and standard deviation of 15 for each of the four branches, the experiential and strategic areas, and total emotional intelligence. The MSCEIT-YV responses were scored by the publishing company and sent back in spreadsheet. Raw scores were generated wherein the experiential area score is the sum of branch one and branch two scores, the strategic area score is the sum of branch three and

four scores, and the full scale emotional intelligence score is the sum of both area scores. The publishing company was not able to provide details on how the scores were generated because the methods are copyrighted, but they were able to say that larger scores represent higher emotional intelligence. The college sample and the high school sample were analyzed separately because the MSCEIT-YV scores were not yet normed nor in the same standard form as the MSCEIT scores.

Correlational analysis was used to investigate the relationship between emotional intelligence, personality and risk. Full-scale scores on the emotional intelligence test were compared with each of the five factors of the NEO-FFI and each of the four factor scores and total scores of the ARQ. The four branch scores were also compared with each of the factors from the NEO-FFI and ARQ. Once gender was controlled, stepwise multiple regression was used to understand the ability of the emotional intelligence test and the NEO-FFI to predict risk behaviors and risk beliefs. Incremental validity was also assessed through multiple regression by a calculation of variance change. Each of the five NEO FFI factors were entered into a hierarchical regression formula with the MSCEIT total score and branch scores entered as the second step. The variance change was calculated by subtracting the variance with the MSCEIT from the original variance of the personality factor.

In order to look at the developmental aspect of emotional intelligence, the mean total emotional intelligence was found for each age group. The standard deviation for the standard scores in the college sample is 15 and the standard deviation for the high school sample was calculated and used to compare the emotional intelligence scores across the

high school age groups. Lastly, internal consistency was calculated for each of the study measures, and split-half reliability was calculated for the MSCEIT and MSCEIT-YV due to homogeneity of item content.

CHAPTER 6

RESULTS

Psychometric Properties of Study Measures

Table 2 shows the descriptive statistics for the all measures used in this study. The internal consistency reliabilities of the NEO FFI scales (Neuroticism, Openness, Extroversion, Agreeableness, Conscientiousness) were found to be excellent with alphas of 0.84, 0.83, 0.73, 0.73, and 0.79 respectively.

As expected, the internal consistency reliabilities of the ARQ total behavior and belief scales were excellent for this sample. The risk behavior portion of the ARQ was found to have an alpha of 0.75 and the risk beliefs portion of the ARQ had an alpha of 0.84. Of the subscales of the risk behavior questionnaire, three showed poor reliabilities in this sample. The Cronbach's alpha coefficients were 0.43 for the thrill seeking scale, 0.35 for the reckless scale, and 0.52 for the anti-social scale. The reliability for the rebellious behavior scales was excellent with an alpha of 0.80. The reliabilities for the risk beliefs subscales were higher than those of the behavior scales, although one of the scales showed a poor reliability (0.48 for the reckless scale). The other scales showed adequate reliability: 0.66 for the thrill seeking scale, 0.70 for the rebellious scale, and 0.59 for the anti-social scale.

Table 2

Descriptive Statistics on Included Measures

Scale	Mean	SD	Reliability[a]
MSCEIT - Total	100.98	13.9	$\alpha = 0.78$, $r = 0.59$
MSCEIT - Experiential	104.82	14.9	$\alpha = 0.87$, $r = 0.76$
MSCEIT - Strategic	97.51	12.72	$\alpha = -0.05$, $r = -0.18$
MSCEIT - Perceiving emotions	105.4	13.4	$\alpha = 0.87$, $r = 0.71$
MSCEIT - Using emotions	101.47	15.34	$\alpha = 0.70$, $r = 0.60$
MSCEIT - Understanding emotions	97.38	14	$\alpha = -0.14$, $r = -0.21$
MSCEIT - Managing emotions	99.85	14.19	$\alpha = 0.17$, $r = -0.25$
MSCEIT-YV - Total	207.44	37.35	$\alpha = 0.90$, $r = 0.75$
MSCEIT-YV - Experiential	117.04	16.84	$\alpha = 0.91$, $r = 0.82$
MSCEIT- YV - Strategic	90.4	23.99	$\alpha = 0.62$, $r = 0.32$
MSCEIT-YV - Perceiving emotions	58.32	9.85	$\alpha = 0.85$, $r = 0.84$
MSCEIT-YV - Using emotions	58.72	12.73	$\alpha = 0.87$, $r = 0.70$
MSCEIT-YV - Understanding emotions	55.81	15.53	$\alpha = 0.31$, $r = 0.18$
MSCEIT-YV - Managing emotions	34.59	10.99	$\alpha = 0.64$, $r = 0.75$
ARQ-Risk Behavior Total	23.98	8.21	$\alpha = 0.75$
ARQ - Risk Behavior Thrill-seeking	6.95	2.99	$\alpha = 0.43$
ARQ - Risk Behavior Rebellious	7	4.07	$\alpha = 0.80$
ARQ - Risk Behavior Reckless	4.12	2.36	$\alpha = 0.35$
ARQ - Risk Behavior Anti-social	5.9	2.48	$\alpha = 0.50$
ARQ-Risk Beliefs Total	48.82	9.44	$\alpha = 0.84$
ARQ - Risk Beliefs Thrill-seeking	10.62	3.58	$\alpha = 0.66$
ARQ - Risk Beliefs Rebellious	12.26	3.14	$\alpha = 0.70$
ARQ - Risk Beliefs Reckless	15.61	2.3	$\alpha = 0.48$
ARQ - Risk Beliefs Anti-social	10.33	8.21	$\alpha = 0.59$
NEO FFI Neuroticism	22.46	7.9	$\alpha = 0.84$
NEO FFI Extroversion	31.33	6.39	$\alpha = 0.83$
NEO FFI Openness	25.75	6.41	$\alpha = 0.73$
NEO FFI Agreeableness	31.08	6.31	$\alpha = 0.73$
NEO FFI Conscientiousness	31.18	6.17	$\alpha = 0.79$

[a]Reported are Cronbach alpha internal consistency reliabilities for all measures. Split half reliabilities were added for the MSCEIT and MSCEIT-YV.

In order to check for congruence of risk beliefs with risk behaviors, correlational analyses were done. Total risk behavior scores showed an inverse correlation with total risk beliefs ($r = -0.475$, $p < 0.001$). The subscale analysis was similar in that all of the risk behavior subscales showed significant inverse correlations with the subscales of the risk beliefs scores of the ARQ (see Table 3). These analyses provide an affirmation that the perception of risk in the sample participants is similar to what the researcher views as risk. Higher perceived risk was related to lower incidence of that type of behavior across all scales of the ARQ.

Table 3

Intercorrelations Between Risk Behavior and Risk Belief Subscales.

	1	2	3	4	5	6	7	8
Beliefs								
1. Thrill	1	0.435**	0.513**	0.492**	-0.309**	-0.138	-0.247**	-0.237**
2. Rebel		1	0.573**	0.506**	-0.124	-0.52**	-0.462**	-0.343**
3. Reckless			1	0.560**	-0.121	-0.191*	-0.433**	-0.225**
4. Anti-social				1	-0.087	-0.104	-0.291**	-0.455**
Behaviors								
5. Thrill					1	0.051	.234**	.183*
6. Rebel						1	.532**	.356**
7. Reckless							1	.473**
8. Anti-social								1

* $p < 0.05$ ** $p < 0.01$

Internal consistency reliability was calculated for total emotional intelligence using all of the items on the MSCEIT and was found to be excellent ($\alpha = 0.78$). Similarly, internal consistency reliabilities were calculated for the four branch scores and

the area scores. The internal consistency reliabilities for the Experiential and Reasoning area scores in this sample were 0.87 and –0.05 respectively. The Perceiving and Using branch scores were found to have excellent reliabilities with alphas of 0.87 and 0.70 respectively. However, the reliabilities of the Understanding and Managing branch showed very poor reliabilities with alphas of -0.14 and 0.17 respectively. The MSCEIT total score split-half reliability was found to be 0.59 in this sample. The area scores (Experiential and Reasoning) spilt-half reliabilities are 0.76 and –0.18 respectively. The four branch score split-half reliabilities range from –0.25 for the Managing branch to 0.71 for Perceiving branch. These scores are not comparable to the data from the MSCEIT manual (as cited above) and data from Lopes, Salovey, and Straus (2003) who reported a split-half reliability of 0.88 for the total score and branch score split half reliabilities ranging from 0.60 for the managing emotions branch to 0.89 for the perceiving emotions branch. Split half reliabilities are normally preferred over internal consistency reliability for the MSCEIT due to item heterogeneity and because each branch of the test is comprised of two different subtests (Mayer et al., 2002; Lopes et al., 2003).

Internal consistency reliability was also calculated for the MSCEIT-YV. The total emotional intelligence reliability was calculated using all 184 items and was found to be excellent ($\alpha = 0.90$). Similarly, internal consistency reliabilities were calculated for the four branch scores and the area scores. The internal consistency reliabilities for the experiential and reasoning area scores in this sample were 0.91 and 0.62 respectively. The Perceiving and Using branch scores were found to have excellent reliabilities with alphas of 0.85 and 0.87 respectively. The reliabilities of the Understanding and

Managing branch showed moderate reliabilities alphas of 0.31 and 0.64 respectively. The MSCEIT-YV total score split-half reliability was found to be 0.75 in this sample. The area scores (Experiential and Reasoning) spilt-half reliabilities are 0.82 and 0.32 respectively. The four branch score reliabilities range from 0.18 for the Understanding branch to 0.84 for the Perceiving branch.

ARQ Scores in College and High School Students

Independent t tests compared the risk behavior scale scores and risk belief scale scores of both the college students and high school students. College students responded to the ARQ with significantly higher scores than the high school students on the total risk behavior scale (t (169) = 2.556, p = 0.011), rebellious risk behavior scale (t (169) = 2.955, p = 0.004), and reckless risk behavior scale (t (169) = 2.945, p = 0.004). Comparison of thrill seeking behavior scores and antisocial behavior scores revealed no significant differences. Scores on the risk beliefs portion of the ARQ for the college students and high school students were essentially the same as independent t tests showed no significant differences between the groups mean responses on any of the five risk belief scales.

Emotional Intelligence and Risk Behavior

College Sample

Total emotional intelligence was not significantly correlated with total risk behavior or any of the four risk behavior subscales. Table 4 shows the Pearson correlations between the MSCEIT and the ARQ for the college participants. Neither of the area emotional intelligence scores was significantly correlated with the risk behavior

scales. The Perceiving emotions branch score was inversely correlated with thrill seeking behaviors ($r = -0.236$, $p = 0.019$) and the Managing emotions branch score was positively correlated with anti-social behaviors ($r = 0.215$, $p = 0.033$). The direction of these correlations is opposite of the direction expected.

The data from the risk beliefs scales of the ARQ provides very different data from that of the risk behavior scales. Total emotional intelligence showed a significant negative correlation with rebellious risk perception ($r = -0.200$, $p = 0.029$) and showed small correlations with total risk beliefs ($r = -0.191$, $p = 0.059$) and anti-social risk perception ($r = -0.182$, $p = 0.071$). Analysis of the branch and area scores showed several significant inverse correlations. Understanding emotions was inversely correlated with total risk beliefs score ($r = -0.306$, $p = 0.002$), rebellious risk perception ($r = -0.360$, $p < 0.001$), and antisocial risk perception ($r = -0.275$, $p = 0.006$). These significant correlations within the Understanding emotions branch drove the Reasoning emotions area scores to significance.

Table 4

Pearson Correlations for the MSCEIT and ARQ in College Participants.

	Perceive	Using	Understand	Manage	Experiential	Reasoning	Total EI
Total Behaviors	-0.093	-0.17	0.04	0.104	-0.164	0.071	-0.042
Thrill Behavior	**-0.236***	0.011	-0.087	-0.099	-0.16	-0.111	-0.174
Rebellious Behavior	0.018	-0.172	0.086	0.095	-0.09	0.103	0.028
Reckless Behavior	-0.006	-0.176	0.053	0.099	-0.103	0.07	-0.005
Anti-social Behavior	-0.054	-0.125	0.042	**0.215***	-0.106	0.132	0.026
Total Beliefs	0.045	-0.145	**-0.306*****	-0.028	-0.034	**-0.274****	-0.191
Thrill Beliefs	-0.022	**-0.250***	-0.15	0.025	-0.135	-0.126	-0.149
Rebellious Beliefs	-0.011	-0.024	**-0.360****	-0.091	-0.088	**-0.330****	**-0.220***
Reckless Beliefs	**0.217***	-0.006	-0.196	0.074	0.135	-0.136	-0.01
Anti-social Beliefs	0.026	-0.101	**-0.275****	-0.086	-0.02	**-0.275****	-0.182

* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

In the multiple regression analysis gender was controlled ($r^2 = 0.067$) and the subsequent stepwise analysis revealed that Understanding emotions predicted scores of total risk perception ($\beta = -0.306$, $p = .002$, $r^2 = 0.094$), while the other branch scores, area scores and the total score of emotional intelligence did not predict risk perception. In an analysis of the risk belief subscales, Using emotion predicted thrill-seeking beliefs ($\beta = -0.236$, $p = .021$, $r^2 = 0.067$), Understanding emotion predicted rebellious beliefs ($\beta = -0.357$, $p = .001$, $r^2 = 0.125$) and antisocial beliefs ($\beta = -0.321$, $p = .005$, $r^2 = 0.101$). High scores on the Perceiving emotion branch ($\beta = 0.279$, $p = .010$) and low scores on the Understanding emotion branch ($\beta = -0.331$, $p = .002$) together best predicted reckless beliefs ($r^2 = 0.138$). Emotional intelligence did not predict risk behaviors.

High School Sample

Emotional intelligence showed the opposite relationships in the high school sample as in the college sample. Total emotional intelligence was negatively correlated with reckless behavior ($r = -0.277$, $p = 0.018$). Analysis of the emotional intelligence branch scores revealed several significant correlations. Understanding emotions was significantly correlated with total risk behaviors ($r = -0.249$, $p = 0.035$) and reckless behaviors ($r = -0.318$, $p = 0.006$). Managing emotions was significantly correlated with reckless behaviors ($r = -0.329$, $p = 0.005$). Again, these correlations drove the Reasoning emotions area score to be significantly correlated with both total risk behaviors ($r = -0.246$, $p = 0.037$) and reckless behaviors ($r = -0.357$, $p = 0.002$).

Thrill seeking risk perception was the only scale of the ARQ that was significantly correlated with emotional intelligence. The managing emotions branch score and the Reasoning area score were positively correlated with thrill seeking risk perception ($r = 0.240$, $p = 0.042$ and $r = 0.247$, $p = 0.037$ respectively).

Table 5

Pearson Correlations for the MSCEIT-YV and ARQ in High School Participants.

	Perceive	Using	Understand	Manage	Experiential	Reasoning	Total EI
Total Behaviors	0.053	-0.001	**-0.249***	-0.185	0.03	**-0.246***	-0.144
Thrill Behavior	-0.023	0.078	-0.194	0.001	0.045	-0.125	-0.06
Rebellious Behavior	0.067	-0.043	-0.142	-0.141	0.006	-0.157	-0.098
Reckless Behavior	-0.017	-0.129	**-0.318****	**-0.329****	-0.107	**-0.357****	**-0.277***
Anti-social Behavior	0.113	0.088	-0.044	-0.068	0.321	-0.06	0.021
Total Beliefs	-0.047	0.064	0.107	0.222	0.021	0.171	0.119
Thrill Beliefs	0.014	0.106	0.221	**0.240***	0.088	**0.247***	0.198
Rebellious Beliefs	-0.089	0.019	0.062	0.158	-0.038	0.113	0.055
Reckless Beliefs	-0.075	0.073	0.084	0.134	0.011	0.115	0.079
Anti-social Beliefs	-0.005	0.008	-0.029	0.184	0.004	0.066	0.044

* $p \leq 0.05$ ** $p \leq 0.01$

In the multiple regression analysis gender was controlled ($r^2 = 0.001$) and the subsequent stepwise analyses showed Understanding emotions to be a predictor of total risk behaviors ($\beta = -0.249$, $p = 0.035$, $r^2 = 0.062$). When Using emotions was added to Understanding emotions, the model was best predictive of total risk behavior (see Table 6) in that high scores on Using emotions and low scores on Understanding emotions best predicted total risk behavior. In an analysis of the risk behavior subscales, the Reasoning area score was predictive of reckless behaviors ($\beta = -0.378$, $p = 0.003$, $r^2 = 0.123$). Table 6 shows the stepwise regression models for total risk in both the college and high school participants.

Table 6

Stepwise Regression Models for Prediction of Total Risk[a]

(a) College Participants	Beta	p-value	R^2
Understanding emotions	-0.330	0.003	0.106
(b) High School Participants			
Model 1 Understanding emotions	-0.287	0.019	0.077
Model 2 Understanding emotions	-0.558	0.001	0.139
Using emotions	0.396	0.030	

[a] Total risk beliefs predicted in the college participants and total risk behavior predicted in the high school participants.

Emotional Intelligence and Age

Again, the college and high school participants were analyzed separately due to the difference in emotional intelligence scores received from the publishing company – the college sample scores are in standard scores while the high school sample scores are raw, non-standardized scores.

Within the college participants, age was not significantly correlated with the branch scores of the MSCEIT, and total emotional intelligence did not show a significant relationship with age ($r = .192, p = 0.052$). A look at the means across age groups revealed that 22-year-olds had a mean total emotional intelligence score that was 20 points (greater than one standard deviation) higher than the 18 year olds. The 21-year-olds and 23-year-olds also had a higher mean total emotional intelligence score (4 points and 9 points respectively), but these differences are minimal. The 24-year-olds showed a 1-point difference than the 18-year-olds in mean total emotional intelligence. An

analysis of variance with age as the independent variable and the branch scores of the MSCEIT as the dependent variables revealed no significant relationship between age and the four branches of emotional intelligence.

Within the high school participants, age was significantly correlated with the branch scores of the MSCEIT: Perceiving emotions ($r = -0.339, p = 0.004$), Using emotions ($r = -0.283, p = 0.016$), Understanding emotions ($r = -0.329, p = 0.005$), and Managing emotions ($r = -0.320, p = 0.006$). Total emotional intelligence was also significantly correlated with age ($r = -0.417, p < 0.001$). In order to better understand the meaning of the raw total emotional intelligence scores, the standard deviation of the sample was calculated (S.D. = 37.35). The mean total emotional intelligence score of 15-year-olds was 42 points (greater than one standard deviation) higher than the mean total emotional intelligence score of the 18-year-olds, 26 points higher than 17-year-olds and 10 points higher than the 16-year-olds. Analysis of variance revealed age showed significant relationships with Perceiving emotions ($F(3,71) = 3.33, p = 0.025$) and Understanding emotions ($F(3, 71) = 2.92, p = 0.040$). The relationship between Managing emotions and age neared significance ($F(3, 71) = 2.61, p = 0.058$). Tukey post hoc analysis revealed that the 15-year-olds had mean branch scores that were significantly higher than the 18-year-olds, but 16- and 17-year-olds did not have significantly different branch scores from either 15- or 18-year-olds (see Table 7).

Table 7

Mean Differences of Branch Scores across High School Age Groups

Perceiving Emotion Branch				
Age Groups	15	16	17	18
15	0	0.379	5.937	8.538*
16		0	5.558	8.16
17			0	2.6
18				0
Using Emotion Branch				
Age Groups	15	16	17	18
15	0	2.478	6.418	9.538
16		0	3.939	7.061
17			0	3.121
18				0
Understanding Emotions Branch				
Age Groups	15	16	17	18
15	0	2.789	6.929	14.462*
16		0	4.139	11.672
17			0	7.533
18				0
Managing Emotions Branch				
Age Groups	15	16	17	18
15	0	3.984	6.58	9.385
16		0	2.596	5.401
17			0	2.805
18				0

* $p \leq 0.05$

Incremental Validity of Emotional Intelligence

College Sample

Emotional intelligence was not significantly correlated with risk behavior scales and did not show significant predictive value in risk behavior; and therefore, incremental

validity of emotional intelligence over personality measures was not analyzed. Table 8 shows the correlational analysis between the NEO FFI five factors and the ARQ risk behavior scales. Stepwise multiple regression showed Conscientiousness was a significant predictor of total risk behaviors ($\beta = -0.229$, $p = 0.022$, $r^2 = 0.053$).

Table 8

Pearson Correlations for the NEO FFI Five Factors and ARQ in College Participants

	NEO-N	NEO-E	NEO-O	NEO-A	NEO-C
Total Behaviors	0.02	0.092	**0.201***	-0.107	**-0.229***
Thrill Behavior	**-0.312****	**0.197***	0.175	0.168	-0.127
Rebellious Behavior	0.094	0.003	**0.208***	**-0.201***	-0.124
Reckless Behavior	0.179	-0.112	0.046	-0.122	-0.162
Anti-social Behavior	0.121	0.169	0.055	-0.1	**-0.255***
Total Beliefs	0.145	**0.226***	**-0.205***	-0.074	**0.218***
Thrill Beliefs	**0.245***	0.078	-0.182	**-0.200***	0.168
Rebellious Beliefs	-0.002	0.187	**-0.257***	0.002	**0.224***
Reckless Beliefs	0.087	**0.229***	-0.106	0.147	0.143
Anti-social Beliefs	0.077	**0.260****	-0.08	-0.078	0.145

* $p \leq 0.05$ ** $p \leq 0.01$

Table 8 also shows the correlational analysis of risk belief scales and the NEO FFI. Stepwise multiple regression showed a model with Extroversion, Neuroticism, and Conscientiousness best predicted total risk beliefs. The significant correlations between the emotional intelligence scales and risk belief scales were tested for incremental validity when controlled for personality factors. Table 9 shows the final models for tested incremental validity of emotional intelligence. Total emotional intelligence showed an increase in variance (not a significant difference) for each statistically

significant model for prediction of total risk beliefs, rebellious risk perception, and antisocial risk perception. There were significant increases in accounted for variance when the Understanding branch score was added to personality factors (see Table 9).

Table 9

R^2 in Regression Models of College Participants

	Personality Factor	R^2	R^2 with EI[a] Added (Change)	R^2 with Under[b] Added
Total Risk Beliefs	Neuroticism	0.021	0.053 (.03)	0.109 (.09)**
	Extroversion	0.09	0.107 (.02)	0.136 (.05)*
	Conscientiousness	0.146	0.171 (.03)	0.19 (.04)*
Rebellious Risk Beliefs	Openness	0.066	0.095 (.03)	0.166 (.10)***
Anti-Social Risk Beliefs	Extroversion	0.068	0.088 (.02)	0.106 (.04)*

* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0$ .001
[a] Total emotional intelligence
[b] Understanding branch

High School Sample

Emotional intelligence was not significantly correlated with the risk belief scales and did not show significant predictive value in risk beliefs; and therefore, incremental validity of emotional intelligence over personality measures was not analyzed. Table 10 shows the correlational analysis between the NEO FFI five factors and the ARQ risk belief scales. Multiple regression showed Agreeableness was a significant predictor of total risk behaviors ($\beta = 0.418, p < 0.001, r^2 = 0.175$).

Table 10

Correlations for the NEO FFI Five Factors and ARQ in High School Participants

	NEO-N	NEO-E	NEO-O	NEO-A	NEO-C
Total Behaviors	-0.032	0.146	-0.147	**-0.424****	**-0.268***
Thrill Behavior	-0.148	**0.253***	0.034	-0.112	0.035
Rebellious Behavior	0.04	-0.037	-0.106	**-0.272***	**-0.284***
Reckless Behavior	-0.199	0.163	**-0.313****	**-0.374****	-0.177
Anti-social Behavior	0.2	0.06	-0.054	**-0.454****	**-0.304***
Total Beliefs	0.051	0.004	0.066	**0.418****	**0.255***
Thrill Beliefs	-0.006	-0.056	-0.14	**0.278***	0.087
Rebellious Beliefs	0.072	0.027	0.094	**0.366****	**0.277***
Reckless Beliefs	**0.253***	0.001	0.232	**0.318****	0.165
Anti-social Beliefs	-0.135	0.048	0.074	**0.410****	**0.312****

* $p \leq 0.05$ ** $p \leq .01$

Table 10 also shows the correlational analysis of risk behavior scales and the NEO FFI. Stepwise multiple regression showed a model with Agreeableness, Extroversion, and Conscientiousness best predicted total risk behavior. The significant correlations between the emotional intelligence scales and risk behavior scales were tested for incremental validity when controlled for personality factors.

Table 11 shows the final models for tested incremental validity of emotional intelligence. Total emotional intelligence showed no change in variance over personality factors for the prediction of total risk behavior, but did show an increase in accounted for variance for reckless risk behavior; although, this increase was not significant. Understanding emotions and Managing emotions showed an increase in accounted for

variance over Agreeableness and Extroversion for prediction of both total risk behavior and reckless risk behavior, but did not show a significant increase for Openness.

Table 11

R^2 in Regression Models of High School Participants

	Personality Factor	R^2	R^2 with EI[a] (Change)	R^2 with Under[b]	R^2 with Manage[c]	R^2 with Reason[d]
Total Risk Behavior	Agreeableness	0.18	0.18 (0)	0.196 (.02)	0.186 (.01)	0.195 (.02)
	Extroversion	0.277	0.277 (0)	0.286 (.01)	0.285 (.01)	0.288 (.01)
	Conscientiousness	0.319	0.319 (0)	0.323 (0)	0.322 (0)	0.324 (0)
Reckless Risk Behavior	Agreeableness	0.14	0.168 (.03)	0.185 (.05)	0.203 (.06)*	0.205 (.07)*
	Extroversion	0.236	0.267 (.03)	0.27 (.05)	0.306 (.07)*	0.295 (.06)*
	Openness	0.319	0.33 (.01)	0.334 (.03)	0.351 (.03)	0.346 (.03)

* $p \leq 0.05$
[a] Total emotional intelligence added
[b] Understanding branch added
[c] Managing branch added
[d] Reasoning area added

Supplemental Analysis

Gullone and Moore (2000) investigated the relationship between the NEO FFI and ARQ in adolescents aged 11 to 18 years. A correlational analysis within the total participant sample of this study was done to compare results to the previous research. Total risk behavior score was inversely correlated with Agreeableness ($r = -0.198, p = 0.010$) and Conscientiousness ($r = -0.174, p = 0.024$). An analysis of the risk behavior subscales revealed several significant correlations. Neuroticism was inversely correlated with thrill seeking behavior ($r = -0.236, p = 0.002$) and positively correlated with antisocial behavior ($r = 0.152, p = 0.048$). Extroversion was positively correlated with thrill seeking

behavior. Agreeableness was inversely correlated with rebellious behavior (r = -0.161, p = 0.036), reckless behaviors (r = -0.176, p = 0.022), and antisocial behavior (r = -0.262, p = 0.001). Conscientiousness was correlated with only antisocial behavior (r = -0.259, p = 0.001). Openness was not significantly correlated with any of the risk behavior subscales.

Total risk beliefs score was positively correlated with Agreeableness (r = 0.161, p = 0.36) and Conscientiousness (r = 0.227, p = 0.003). There were several significant correlations between the NEO FFI and ARQ risk belief subscales. Neuroticism was positively correlated with reckless risk beliefs (r = 0.167, p = 0.030). Extroversion was positively correlated with antisocial risk beliefs (r = 0.194, p = 0.012). Openness was inversely correlated with thrill seeking risk beliefs (r = -0.164, p = 0.033). Agreeableness was positively correlated with reckless risk beliefs (r = 0.212, p = 0.006) and antisocial risk beliefs (r = 0.178, p = 0.021). Conscientiousness was positively correlated with rebellious risk beliefs (r = 0.201, p = 0.009) and antisocial risk beliefs (r = 0.263, p = 0.001). Table 12 shows the correlational analysis between the ARQ and the NEO FFI.

Table 12

Pearson Correlations Between the ARQ and NEO FFI within All Participants

	NEO - N	NEO - E	NEO - O	NEO - A	NEO - C
(a) Beliefs					
Total	0.102	0.127	-0.089	0.161*	0.227**
Thrill Seeking	0.142	0.031	-0.164*	0.018	0.129
Rebellious	0.044	0.09	-0.102	0.147	0.201**
Reckless	0.167*	0.111	0.044	0.212**	0.131
Antisocial	-0.025	0.194*	-0.011	0.178*	0.263***
(b) Behaviors					
Total	-0.021	0.141	0.061	-0.198**	-0.174*
Thrill Seeking	-0.236**	0.220**	0.113	0.033	-0.028
Rebellious	0.049	0.021	0.093	-0.161*	-0.121
Reckless	-0.019	0.049	-0.099	-0.176*	-0.088
Antisocial	0.152*	0.12	0.008	-0.262***	-0.259***

* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0$ .001

These results are similar to that of Gullone and Moore (2000) with Agreeableness and Conscientiousness showing the most consistent significant correlations across the risk subscales, but there are differences between the present study and the previous research. In the present study, Extroversion did not predict total risk behavior score or any of the negative risk behaviors as in the previous research. Gullone and Moore (2000) reported significant correlations between Extroversion and thrill seeking beliefs (r = -0.22, $p < 0.001$), antisocial beliefs (r = -0.17, $p < 0.001$), rebellious beliefs (r = -0.16, $p <$ 0.01) and reckless beliefs (r = -0.12, $p < 0.01$). While Gullone and Moore (2000) did not report significant correlations between Neuroticism and risk behavior subscales, the present results show Neuroticism to have significant relationships with both thrill seeking

behavior and antisocial behavior. A potential explanation for these differences is the difference in age range between the two studies. Gullone and Moore (2000) report an age range of 11 to 18 year while the present study reported an age range of 15 to 24 years. These differences suggest a need for more research that investigates the relationship between the ARQ and the NEO FFI.

CHAPTER 7

DISCUSSION

Emotional Intelligence and Adolescent Risk

The findings of the present study suggest that emotional intelligence is related to risk behavior in high school students. However, in college students, the present results indicate that emotional intelligence is related to risk perception, but not to risk behavior. The mechanism behind this is not understood, as risk perception is not well studied. College students are known to engage in many risk behaviors such as binge drinking, unprotected sex, and drug use (Arnett, 1996). The college participants in the present study endorsed a higher level of risk behavior than the high school participants, but endorsed similar risk perception of the same behaviors as the high school participants. Perhaps the social context of college life (e.g., no parental guidance, peer pressure) leads the older adolescent to engage in such behavior even as the brain perceives risk. Those with high emotional intelligence are overcome by the social circumstances even though they perceive the action is of a higher risk value. There is clearly a difference in the cognition of risk between high school students and college students, and future research in this area is needed.

The present data support the hypothesis that adolescents with high emotional intelligence are equally likely to participate in thrill seeking behaviors as those with lower emotional intelligence. In the high school sample, students with high emotional intelligence were more likely to perceive thrill seeking behaviors as risky, but equally likely to participate in these behaviors. Perhaps students with high emotional intelligence

understand the risk to benefit ratio of participation in such activities as competitions, parachuting and martial arts. Others have also identified the importance of positive risk during adolescence. Moore and Gullone (1996) found that adolescents' risk behavior is influenced by the perceived positive outcomes of the behavior whether the behavior is socially acceptable or not. Erickson described a healthy adolescence as a time when a person searches for his/her identity through experimentation with societal values and family beliefs, exploration of different roles and testing limits. Without this exploration, Erickson felt that identity would not be reached, which would result in difficulties during subsequent stages of adult development (Thomas, 2005). The high emotionally intelligent students in the present study showed an exploration of positive risk as Erickson proposed a healthy adolescent would do; and therefore, it can be concluded that high school students with high emotional intelligence are successfully navigating through the identity stage of development.

The data support the idea that emotional intelligence and risk behavior are related, but the results show this for high school students but not for college students. Also, in addition to total risk behaviors, only reckless behaviors (not rebellious behaviors or antisocial behaviors) were correlated with emotional intelligence. These are behaviors such as drinking and driving, speeding and unprotected sex. The two branches of emotional intelligence that were related to reckless behaviors were Understanding emotions and Managing emotions. Adolescents who have a low ability to understand how emotions change over time, who have an inefficiency in their ability to use emotions in problem solving and who impulsively act on emotion may have difficulty

understanding the consequences of reckless actions on self and others. In addition, Using emotions and Understanding emotions together make up 14% of the variance in the prediction of risk behaviors in high school students and the Reasoning area score of the MSCEIT-YV provides 13% of the variance in the prediction of reckless risk behavior, which suggests that emotional intelligence may serve as a protective factor in high school students who are faced with the choice to participate in risk behaviors, especially reckless risk behaviors. Gender differences did not provide a significant amount of variance in the prediction of risk behaviors and risk beliefs. The regression model for the prediction of risk behaviors revealed that a higher score on the Using emotions branch and a low score on the Understanding branch best predicted total risk behavior. As discussed earlier, the Using emotions branch represents the ability to direct emotions towards thought and the ability to generate emotions on demand. This branch is thought to develop prior to the development of Understanding emotions, and the ability to make decisions based on emotional information without the ability to fully understand emotions may drive an adolescent to participate in negative behavior. The present results indicate that the ability to use emotions in decision making without the ability to understand emotions (or the consequence of the decision made based on emotion) creates a developmental window where the discrepancy in emotional intelligence abilities may be described as a risk factor rather than a protective factor.

It is also interesting to note that the upper level abilities of emotional intelligence are those significantly related to risk behavior in the high school sample. Ability model emotional intelligence is a developmental model where children develop the ability to

perceive emotions first with the ability to assimilate, understand, and manage emotions following as development continues. The present results suggest that adolescents who participate in reckless behavior have no more trouble perceiving and using emotions than those who chose not to participate in these activities. High school students with lower Understanding and Managing emotional intelligence may be slower to develop those brain areas that house the ability to use emotion in decision-making and problem solving.

There is an abundance of research on emotion, decision-making and the prefrontal cortex, especially the orbitofrontal and ventromedial cortices. Research with people who experienced a lesion (due to stroke, tumor resection or traumatic brain injury) in these areas of the brain exhibited poor decision-making due to a deficit in emotional regulation. Lesion patients participated in a gambling task where they were asked to choose cards that resulted in a reward or punishment. The ventromedial lesion patients preferred cards that gave high immediate reward although provided low long-term reward, and also preferred cards that gave low immediate punishment but had high long-term punishment effects (Bechara, Tranel, & Damasio, 2000). This suggests that people with these lesions have trouble making advantageous long-term decisions, but instead are focused on immediate returns that subsequently result in negative consequences. This data was linked to emotion by testing emotional responses through skin conductance during the gambling task. The ventromedial lesion patients did not experience the emotional signal as did the normal participants (Bechara, 2004a; Bechara, et al., 2000), and it is this difference that indicates that emotion plays a vital role in decision-making and that areas of the prefrontal cortex are vital in the connection between emotion and decision-making.

Adolescent brains may be similar to adult lesion brains because the adolescent frontal cortex has yet to fully mature. Adolescent brains are structurally different from those of adults and children, and it is well known that maturation of cognitive function continues through the adolescent years (Case, 1985; Kolb & Fantie, 1989; Stuss, 1992). Researchers have found that there is a surge of gray matter development between the ages of 10 and 12, followed by a decrease of gray matter into the 20's as more efficient connections in the brain are created (Begley, 2000). The area of primary maturation is in the frontal lobes (Gibson, 1991; Jernigan, Press, & Hesselink, 1990), which are the brain areas responsible for executive functions such as organizing and planning (Stuss, 1992), self-control (Segalowitz & Davies, 2004), and emotional regulation (Bechara, 2004b; Rolls, 1998). It is also reported in studies that use scans to visualize brain activity that the emotion centers in the adolescent brain light up during emotional situations while the reasoning portions remain dark (Begley, 2000), which suggests that teens may act on emotions without thought about the action or its consequence. Through neuropsychological testing, there is evidence that performance on tests of executive function (i.e., Wisconsin Card Sorting Task and Stroop Task) are lower in early adolescence compared to late adolescence (Davies & Rose, 1999), and indicates the development of vital brain areas (frontal lobes) necessary for good performance in such executive functions tasks across adolescence. Segalowitz and Davies (2004) studied more specific areas of the frontal lobes with electrophysiological measures and found that the orbitofrontal, dorsolateral and ventromedial cortices (area linked to emotional decision-making) are still developing into late adolescence.

Development of Emotional Intelligence Across Adolescence

The present study tested how emotional intelligence scores change across age groups and found only a small indication of a developmental trend in the college students and a strong trend in the opposite direction then was expected in the high school participants. Within the college sample, there was an increase in the mean total emotional intelligence from age 18 to 22, but the total emotional intelligence score then dropped back to a score comparable to that of the 18-year-old age group. We may have seen a bigger trend with a larger sample size, as there were only 5 participants in both the 23- and 24-year-old age groups. Within the high school sample, the 15-year-olds had significantly higher emotional intelligence scores than the 18-year-olds. If emotional intelligence increases with age as indicated by Mayer et al. (2000), then we should have seen an increase in emotional intelligence scores with increased age. There are several possible explanations for the present data. First, cross-sectional designs are not best suited for understanding development because individual rates of development are not accounted for the study design. It is possible that a longitudinal design would reveal different data trends. Second, a larger and more representative sample may provide data in the correct direction. The study participants were of a restricted age range and the stratification of age groups was not ideal and may have lead to a difference in the data compared to other developmental research. Third, the scores of the MSCEIT-YV used in this study are non-standardized raw scores that may bias the data for the younger participant. Lastly, the developmental study design would have benefited from an

analysis that included both the high school and college participants, but the difference in emotional intelligence scores did not allow such an analysis.

There is only one previous study within which to compare the present developmental data, and it is also from a cross-sectional study. Mayer et al. (2000) compared the scores of a group of adolescents between the ages of 11 and 17 and a group of adults between the ages of 17 and 70 on several age appropriate subtests of the MEIS. They found that the adult participants had a significantly higher combined mean emotional intelligence score than the adolescent participants ($F(1,709) = 22.3, p < 0.001$). There are several limitations to this study in addition to the cross-sectional design, and more research on the developmental nature of emotional intelligence is necessary.

Incremental Validity of Emotional Intelligence

This study also hypothesized that emotional intelligence has incremental validity over personality measures. The data in the present study are similar to that of Lopes et al. (2003). They found emotional intelligence to have incremental validity over personality measures in the prediction of perceived quality of social relationships. Managing emotions showed a variance increase of 5% over Neuroticism and Extroversion in the prediction of positive relations with others. Managing emotions also showed an increase in predictive value over all NEO FFI five factors in the prediction of social support with parents. Conscientiousness along with Using emotions, Understanding emotions and Managing emotions accounted for 21% of the variance in the prediction of negative interactions with friends, over the 5% of the variance with only Conscientiousness (Lopes et al., 2003).

Our data show that emotional intelligence provides incremental validity over personality factors in the prediction of risk behavior in high school students and provides incremental validity over personality in the prediction of risk beliefs in college students. In the high school sample, total emotional intelligence, Understanding emotions, Managing emotions and the Reasoning area score provided incremental validity in the prediction of reckless risk behavior. The greatest increases in accounted for variance were provided by Managing emotions (7%) over Extroversion and the Reasoning area score (7%) over Agreeableness. No emotional intelligence measure provided incremental validity over personality in the prediction of total risk behavior in the high school sample. In the college student sample, total emotional intelligence and Understanding emotions provided incremental validity over personality factors in the prediction of risk beliefs with Understanding emotions providing the greatest increase in accounted for variance (10%) over Openness in the prediction of rebellious risk beliefs. These data suggest that emotional intelligence does provide some incremental validity over the NEO FFI, but the data is specific to type of risk behavior and may not provide increased prediction value for overall risk behavior. In addition, emotional intelligence provides the greatest incremental validity for risk beliefs in the college student sample. This suggests that emotional intelligence may best predict certain cognitive processes related to risk behavior rather than the overt behaviors themselves.

Limitations to the Present Study

Limitations to the present investigation include the use of the NEO FFI in the measurement of personality in the high school participants. Whereas the NEO FFI has

been used extensively with adults, it is used less frequently with adolescents. This study did replicate the findings of Gullone and Moore (2000) in that the ARQ risk behavior scales were significantly correlated with Openness, Agreeableness, and Conscientiousness. Research using the NEO FFI with adolescents should continue to solidify these results. The use of the research version of the MSCEIT-YV is also a limitation of the present study as it is not yet in its final published form. The generated scores are not in standard form; and therefore it is difficult to understand the true meaning of the scores.

The reliabilities of the some of the ARQ subscales and MSCEIT are poor, which indicates that the predictive validity may not as impressive as the data show. The reliabilities for this sample are lower than those reported by the test developers and others who have used these scales in their research, and may be due to the limited demographics of the participant sample, which are mainly Caucasian females who are approximately 18 years of age. Gullone, Moore, Moss, and Boyd (2000) found that the reliability of the antisocial subscale was lower in girls than in boys ($\alpha = 0.66$).

There are demographic limitations to this study. The sample is not representative of the nation's population, the college sample contains a high percentage of females, and the older age groups have a small number of participants. Future efforts should focus on recruitment of minorities and males, and better stratify the sample for age. Research on the ability model of emotional intelligence is in its infancy and therefore little research on emotional intelligence is done with large groups of minorities and people from cultures other than the majority European-American culture. Studying various cultures will

provide greater insight into the social and cognitive mechanisms at play in emotional intelligence.

Other limitations include those mentioned previously with regard to the analysis of emotional intelligence development. Cross-sectional designs are not best suited for understanding development and the developmental hypothesis statistical design would have benefited from an analysis that included both the high school and college participants. Future research should aim to replicate the present study with an addition of a longitudinal investigation for more accurate results about the predictive validity of emotional intelligence. This type of research design will also allow for a better understanding of the development of emotional intelligence across the age span.

Applications and Future Research

As research on the ability model of emotional intelligence is expanded, there are applied areas of psychology that may benefit. Educational programs based on emotional intelligence and industrial/organizational programs are currently available. These programs are largely based on Goleman's popularized emotional intelligence (Mayer & Cobb, 2000), which he claims can predict 80% of success in life (Goleman, 1995). This high percentage was highly attractive to curriculum developers and researchers who searched for a construct beyond traditional intelligence that would explain students who were smart, but who achieved at a lower level scholastically and socially (Mayer & Cobb, 2000). By 1997, there were at least 22 formal educational programs that emphasized emotional intelligence, with some threading emotional intelligence throughout the school's entire curriculum (Elias, Zins, Weissberg, Frey, Greenberg, Haynes, et al.,

1997). Education experts must take care not to trivialize the concept of emotional intelligence because there is a growing body of research that supports the predictive validity of the original conceptualization of emotional intelligence. If emotional intelligence is an ability, an intelligence, then there is a possibility that these abilities can be sharpened through proper educational instruction as crystallized intelligence is sharpened through literacy programs. Mayer and Cobb (2000) claimed that educators and curriculum developers should be judicious in their foundation for emotional intelligence based curricula because good, sound research can easily be overlooked for popular theory. They feel that if emotional intelligence becomes more solidly established as a construct, it could then be implemented in educational policy in several ways. They speculate that emotional reasoning may be promoted through courses in liberal arts by discussing the emotions of a character in a story or talking about emotions that are evoked during a piece of music.

Currently, the research is not conclusive about the possible outcomes from the implementation of emotional intelligence based curricula. The current data is mixed on the relationship between emotional intelligence and achievement. Woitaszewski and Aaisma (2004) used the MEIS-A to assess the role of emotional intelligence to the academic success of gifted high school students. They found no correlation between the MEIS-A total score (they did not report branch scores) and grade point average (r = .046) or scores on the Test of Cognitive Skills/Second Edition (r = -.029). However, a recent study by Brackett, Mayer, and Warner (2004) used the MSCEIT in a sample of college students and found that verbal SAT score was significantly correlated with the

Experiential area score ($r = 0.23, p < 0.001$), Reasoning area score ($r = 0.39, p < 0.001$) and total emotional intelligence ($r = 0.35, p < 0.001$). In addition, they found that college grade point average was significantly correlated with the Reasoning area score ($r = 0.18$, $p < 0.01$) and total emotional intelligence score ($r = 0.14, p < 0.05$).

As these discrepancies are resolved with more research, it is possible that we could see positive outcome data for emotional intelligence based curricula in areas of academic achievement and adolescent behavior. Furthermore, future emotional intelligence research might also focus on students who are diagnosed with behavioral disorders. These students might benefit most from a curriculum of this type as they commonly engage in risk behavior and have low academic achievement (Huesmann, Eron, & Yarmel, 1987; McMichael, 1979; Tremblay, Masse, Perron, Leblanc, Schwartzman, & Ledingham, 1992). The body of emotional intelligence research is small and future research seems endless, but we must first overcome the popular theories and get back to basic science in order to give emotional intelligence the proper evaluation needed for it to become a construct embraced by all of psychology.

REFERENCES

Alexander, C. S., Kim, Y. J., Ensminger, M., Johnson, K. E., Smith, J., & Dolan, L. J. (1990). A measure of risk taking for young adolescents: Reliability and validity assessments. *Journal of Youth and Adolescence, 19*, 559-569.

Arnett, J. (1992). Review: Reckless behavior in adolescence: A developmental perspective. *Developmental Review, 12*, 339-373.

Arnett, J. (1996). Sensation seeking, aggressiveness, and adolescent reckless behavior. *Personality and Individual Differences, 20*, 693-702.

Arnett, J., & Balle-Jensen, L. (1993). Cultural bases of risk behavior: Danish adolescents. *Child Development, 64*, 1842-1855.

Bagby, R. M., Taylor, G. J., & Parker, J. D. (1994). The twenty-item Toronto alexithymia scale II. Convergent, discriminant, and concurrent validity. *Journal of Psychosomatic Research, 38* (1), 33-40.

Barkham, M., Hardy, G., & Startup, M. (1996). The IIP-32: A short version of the inventory of interpersonal problems. *British Journal of Clinical Psychology, 32*, 21-35.

Bar-On, R. (1997). *Bar-On emotional quotient inventory: A measure of emotional intelligence*. Toronto. ON: Multi Health Systems, Inc.

Bar-On, R. (2000). Emotional and social intelligence: Insights from the emotional quotient inventory. In R. Bar-On & J. D.A. Parker (Eds.), *The Handbook of Emotional Intelligence.* San Francisco, CA: Jossey-Bass Inc.

Batastini, S. D. (2001). The relationship among students' emotional intelligence , creativity and leadership. Unpublished doctoral dissertation, Drexel University, Philadelphia, PA.

Bechara, A. (2004a). Disturbances of emotion regulation after focal brain lesions. *International Review of Neurology, 62*, 159-193.

Bechara, A. (2004b). The role of emotion in decision-making: Evidence from neurological patient with orbitofrontal damage. *Brain and Cognition, 55*, 30-40.

Bechara, A., Tranel, D., & Damasio, H. (2000). Characterization of the decision-making deficit of patients with ventromedial prefrontal cortex lesions. *Brain, 123*, 2189-2202.

Begley, S. (2000). Getting inside a teen brain: Hormones aren't the only reason adolescents act crazy. Their gray matter differs from children's and adults'. *Newsweek, 135* (9), 58.

Brackett, M. A., & Mayer, J. D. (2003). Convergent, discriminant, and incremental validity of competing measures of emotional intelligence. *Personality and Social Psychology Bulletin, 29*, 1-12.

Brackett, M. A., Mayer, J. D., & Warner, R. M. (2004). Emotional intelligence and its relation to everyday behaviour. *Personality and Individual Differences, 36*, 1387-1402.

Brown, C., George-Curran, R., & Smith, M. L. (2003). The role of emotional intelligence in the career commitment and decision-making process. *Journal of Career Assessment, 11* (4), 379-392.

Carroll, J. B. (1993). *Human cognitive abilities: A survey of factor-analytic studies*. New York: Cambridge University Press.

Caruso, D., Mayer, J. D., & Salovey, P. (2002). Relation of an ability measure for emotional intelligence to personality. *Journal of Personality Assessment, 79* (2), 306-320.

Case, R. (1985). *Intellectual development: Birth to adulthood.* Orlando, FL: Academic.

Cattell, R. B., Cattell, A. K., & Cattell, H. E. (1993). *Sixteen personality factor questionnaire* (5th ed.). Champaign, IL: Institute for Personality and Ability Testing.

Chassin, L., Pearson, C. C., & Sherman, S. (1989). Constructive and destructive deviance in adolescent health-related behaviors. *Journal of Youth and Adolescence, 18*, 245-262.

Ciarrochi, J., Chan, A. Y. C., & Bajgar, J. (2001). Measuring emotional intelligence in adolescence. *Personality and Individual Differences, 31*, 1105-1119.

Coffey, E., Berenbaum, H., & Kerns, J. G. (2003). The dimensions of emotional intelligence, alexithymia, and mood awareness: Associations with personality and performance on an emotional stroop task. *Cognition and Emotion, 17* (4), 671-679.

Costa, P. T. Jr., & McCrae, R. R. (1992) *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor Inventory professional manual*. Odessa, FL. Psychological Assessment Resources, Inc.

Cronbach, L. J. (1960). *Essentials of psychological testing* (2nd ed.). New York: Harper and Row.

Davies, P. L., & Rose, J. D. (1999). Assessment of cognitive development in adolescents by means of neuropsychological tasks. *Developmental Neuropsychology, 15* (2), 227-248.

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology, 44* (1), 113-126.

Donohew, L., Palmgreen, P., & Lorch, E. P. (1994). Attention, need for sensation, and health communication campaigns. *American Behavioral Scientist, 38*, 310-322.

Dulewicz, V., Higgs, M., & Slaski, M. (2003). Measuring emotional intelligence: Content, construct and criterion-related validity. *Journal of Managerial Psychology, 18* (5), 405-420.

Dunn, L. M., & Dunn, L. M. (1981). *PPVT: Peabody picture vocabulary test-revised: Manual for forms L and M.* Circle Pines, MN: American Guidance Service.

Ekstrom, R. B., French, J. W., Harman, H. H., & Dermen, D. (1976). *Manual for kit of factor-referenced cognitive tests* (3rd ed.). Princeton, NJ: Educational Testing Service.

Elias, M. J., Zins, J. E., Weissberg, R. P., Frey, K. S., Greenberg, M. T., & Haynes, N. M., et al. (1997). *Promoting social and emotional learning: Guidelines for educators.* Alexandria, VA: Association for Supervision and Curriculum Development.

Francher, R. E. (1985). *The intelligence men: Makers of the IQ controversy*. New York: W. W. Norton.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences* (10th Anniversary Edition). New York: Basic Books.

Gerrard, M., Gibbons, F. X., Reis-Bergan, M., & Russell, D. W. (2000). Self-esteem, self-serving cognitions, and health risk behavior. *Journal of Personality Assessment, 68* (6), 1177-1201.

Gibson, K. R. (1991). Myelination and behavioral development: A comparative perspective on questions of neoteny, altriciality and intelligence. In K. R. Gibson & A. C. Petersen (Eds.), *Brain maturation and cognitive development* (pp. 29-63). New York: Aldine de Gruyter.

Gillis, J. R., Meyer-Baulburg, H. F., & Exner, T. (1992). A comprehensive test of model predicting sexual risk behavior. *International Conference of AIDS, 8*, 167.

Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist, 48*, 26-34.

Goleman, D. (1995). *Emotional Intelligence: Why it can matter more than IQ*. New York: Bantam Books.

Goleman, D. (1998). What makes a leader? *Harvard Business Review*, 76 (6), 93-102.

Greene, K., Kramar, M., Walters, L. H., Rubin, D. L., & Hale, J. L. (2000). Targeting adolescent risk-taking behaviors: The contribution of egocentrism and sensation-seeking. *Journal of Adolescence, 23* (4), 439-461.

Gullone, E., & Moore, S. (2000). Adolescent risk-taking questionnaire and the five-factor model of personality. *Journal of Adolescence, 23*, 393-407.

Gullone, E., Moore, S., Moss, S., & Boyd, C. (2000). The adolescent risk-taking questionnaire: Development and psychometric evaluation. *Journal of Adolescent Research, 15* (2), 231-250.

Huesmann, L. R., Eron, L. D., & Yarmel, P. W. (1987). Intellectual functioning and aggression. *Journal of Personality and Social Psychology, 52,* 232-240.

Independent Evaluation Consortium. (1998). Final report of the independent evaluation of the California Tobacco Control Prevention and Education Program: Wave 1 data, 1996-1997. Rockville, Maryland: The Gallup Organization.

Irwin, C. E., Jr. (1993). Adolescence and risk taking: How are they related? In N. J. Bell & R. W. Bell (Eds.), *Adolescent risk taking* (pp. 7-28). Newbury Park, CA: Sage Publications.

Irwin, C. E., Jr., & Vaughan, E. (1988). Psychosocial context of adolescent development: Study group report. *Journal of Adolescent Health Care, 9*, 11-20.

Jernigan, T. L., Press, G. A., & Hesselink, J. R. (1990). Methods for measuring brain morphologic features on magnetic resonance images: Validation and normal aging. *Archives of Neurology, 47*, 27-32.

Jessor, R. (1992). Risk behavior in adolescence: A psychosocial framework for understanding and action. *Developmental Review, 12*, 374-390.

Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth.* New York: Academic Press.

Kazdin, A. E. (1998). Preparing and evaluating research reports. *Psychological Assessment, 7*, 228-237.

Kolb, B., & Fantie, B. (1989). Development of the child's brain and behavior. In C. R. Reynolds & E. Fletcher-Janzen (Eds.), *Handbook of clinical child neuropsychology* (pp. 17-39). New York: Plenum.

Lopes, P. N., Salovey, P., & Straus, R. (2003). Emotional intelligence, personality, and the perceived quality of social relationships. *Personality and Individual Differences, 35*, 641-658.

Mayer, J. D., Caruso, D., & Salovey, P. (2000). Emotional intelligence meets traditional standards for an intelligence. *Intelligence, 27*(4), 267-298.

Mayer, J. D., & Cobb, C. D. (2000). Educational policy on emotional intelligence: Does it make sense? *Educational Psychology Review, 12* (2), 163-183.

Mayer, J. D., Perkins, D. M., Caruso, D. R., & Salovey, P. (2001). The measurement of emotional intelligence with scales of ability (the MEIS and MEIS-A) *Roeper Review, 23* (3), 132-137.

Mayer, J. D., & Salovey, P. (1997) What is Emotional Intelligence? In P. Salovey, & D. Sluyter (Eds.), *Emotional Development and Emotional Intelligence*. New York, NY: Basic Books.

Mayer, J. D., Salovey, P., & Caruso, D. (2002). *MSCEIT technical manual*. Toronto, Canada: Multi Health Systems.

Mayer, J. D., Salovey, P., Caruso, D., & Sitarenios, G. (2003). Measuring emotional intelligence with the MSCEIT V2.0. *Emotion, 3* (1), 97-105.

McCrae, R. R., & Costa, P. T. (1997). Personality trait as a human universal. *American Psychologist, 52*, 509-516.

McMichael, P. (1979). The hen or the egg? Which comes first: Antisocial emotional disorders or reading disability? *British Journal of Educational Psychology, 49,* 226-238.

Moore, S., & Gullone, E. (1996). Predicting adolescent risk behavior using a personalized cost-benefit analysis. *Journal of Youth and Adolescence, 25*, 343-359.

Moore, S., & Parsons, J. (2000). A research agenda for adolescent risk-taking: Where do we go from here? *Journal of Adolescence, 23*, 371-376.

Moriarty, N., Stough, C., Tismarsh, P., Eger, D., & Dennison, S. (2001). Deficits in emotional intelligence underlying adolescent sex offending. *Journal of Adolescence, 24*, 743-751.

National Center for Health Statistics (2003). Vital Statistics of the U.S., 2001. *Volume II, Mortality, Part A*. Department of Health & Human Services Publication No. (PHS) 90-1101, Public Health Service, Washington, D.C.: Government Printing Office.

Neisser, U., Boodoo, G., Bouchard, T. J., Boykin, A. W., Brody, N., Ceci, S. J., et al. (1996). Intelligence: Knowns and unknowns. *American Psychologist, 51*, 77-101.

Newsome, S., Day, A. L., & Catano, V. M. (2000). Assessing the predictive validity of emotional intelligence. *Personality and Individual Differences, 29,* 1005-1016.

Nobo, J., & Evans, R. G. (1986). The WAIS-R picture arrangement and comprehension subtests as measures of social behavior characteristics. *Journal of Personality Assessment, 50* (1), 90-92.

Parker, K. C., Hanson, R. K., & Hunsley, J. (1989). MMPI, Rorschach, and WAIS: A meta-analytic comparison of reliability, stability, and validity. *Psychological Bulletin, 103* (3), 367-373.

Petrides, K. V., & Furnham, A. (2000). On the dimensional structure of emotional intelligence. *Personality and Individual Differences, 29*, 313-320.

Roberts, R. D., Zeidner, M., & Matthews, G. (2001). Does emotional intelligence meet the traditional standards for an intelligence? Some new data and conclusions. *Emotion, 1*, 196-231.

Rolls, E. T. (1998). The orbitalfrontal cortex. In A. C. Roberts, T. W. Robbins, & L. Weiskrantz (Eds.), *The prefrontal cortex: Executive and cognitive functions* (pp. 67-86). Oxford: Oxford.

Saklofske, D. H., Austin, E. J., & Minski, P. S. (2003). Factor structure and validity of a trait emotional intelligence measure. *Personality and Individual Differences, 34*, 707-721.

Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition, and Personality, 9* (3), 1989-90.

Salovey, P., Mayer, J., Goldman, S., Turvey, C., & Palfai, T. (1995). Emotional attention, clarity and repair. Exploring emotional intelligence using the trait meta mood scale. In J. W. Pennebaker (Ed.), *Emotion, Disclosure and Health* (3rd ed.). Washington: American Psychological Association.

Sattler, J. M. (2001). *Assessment of Children Cognitive Assessment* (4th Ed.) Jerome M. Sattler Publisher, Inc. La Mesa, CA.

Schutte, N., Malouff, J. M., Hall, L. E., Haggerty, D. J., Cooper, J. T., Golden, C. J., & Dornheim, L. (1998). Development and validation of a measure of emotional intelligence. *Personality and Individual Differences, 25*, 167-177.

Schutte, N. S., Malouff, J. S., Simunek, M., McKenley, J., & Hollander, S. (2002). Characteristic emotional intelligence and emotional well-being. *Cognition and Emotion, 16* (6), 769-785.

Segalowitz, S. J., & Davies, P. L. (2004). Charting the maturation of the frontal lobe: An electrophysiological strategy. *Brain and Cognition, 55*, 116-133.

Shedler, J., & Block, J. (1990). Adolescent drug use and psychological health: A longitudinal inquiry. *American Psychologist, 20*, 381-392.

Sheer, V. C., & Cline, R. J. (1994). The development and validation of a model explaining sexual behavior among college students: Implications for AIDS communication campaigns. *Human Communication Research, 12* (2), 280-304.

Sternberg, R. J., & Caruso, D. R. (1985). Practical modes of knowing. In E. Eisner (Ed.) *Learning and teaching the ways of knowing: 84th Yearbook of the National Society for the Study of Education* (Part II, pp. 133-158). Chicago: University of Chicago Press.

Stuss, D.T. (1992). Biological and psychological development of executive functions. *Brain and Cognition, 20* (1), 8-23.

Thomas, R. M. (2005). *Comparing Theories of Child Development, Sixth Edition.* Belmont, CA: Thomason Wadsworth.

Thorndike, E. L. (1920). Intelligence and its uses. *Harper's Magazine, 140*, 227-235.

Tremblay, R. E., Masse, B., Perron, D., Leblanc, M., Schwartzman, A. E., & Ledingham, J. E. (1992). Early disruptive behavior, poor school achievement, delinquent behavior, and delinquent personality: Longitudinal analyses. *Journal of Consulting & Clinical Psychology. 60* (1), 64-72.

Trinidad, D. R., & Johnson, C. A. (2002). The association between emotional intelligence and early adolescent tobacco and alcohol use. *Personality and Individual Differences, 32*, 95-105.

Udry, J. R. (1988). Biologic predispositions and social control in adolescent sexual behavior. *American Sociological Review, 53*, 709-722.

Wagner, R. K., & Sternberg, R. J. (1985). Practical intelligences in real-world pursuits: The role of tacit knowledge. *Journal of Personality and Social Psychology, 49*, 436-458.

Wechsler, D. (1997). *Wechsler Adult Intelligence Scale-III.* San Antonio, TX: The Psychological Corporation.

Werner, E. E. (1986). Resilient offspring of alcoholics: A longitudinal study from birth to age 18. *Journal of Studies on Alcohol. US: Alcohol Research Documentation, 147* (1), 34-40.

Woitaszewski, S. A., & Aalsma, M. C. (2004). The contribution of emotional intelligence to the social and academic success of gifted adolescents as measured by the Multifactor Emotional Intelligence Scale – Adolescent Version. *Roeper Review, 27* (1), 25-30.

Wolfradt, U., Felfe, J., & Koster, T. (2002). Self-perceived emotional intelligence and creative personality. *Imagination, Cognition and Personality, 21* (4), 293-309.

Yates, J. F. (1992). Epilogue, In J.F. Yates, (Ed.), *Risk-taking behavior* (pp. 321-330). New York: Wiley.

Yates, J. F., & Stone, E. R. (1992). The risk construct. In J.F. Yates, (Ed.), *Risk-taking behavior* (pp. 1-26) New York: Wiley.

Zuckerman, M. (1979). *Sensation seeking: beyond the optimal level of arousal.* Hillsdale, NJ: Erlbaum.

Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking.* New York: Cambridge University Press.

Zuckerman, M., & Neeb, M. (1980). Demographic influences in sensation seeking and expressions of sensation seeking in religion, smoking, and driving habits. *Personality and Individual Differences, 1*, 197-206.

APPENDIX A

ADOLESCENT RISK BEHAVIOR QUESTIONNAIRES AND SCORING

RISK BELIEFS QUESTIONNAIRE

Code Number: .....

DIRECTIONS

Below is written a list of behaviours which some people engage in. Read each one carefully and circle the phrase that best describes your opinion about how risky you think each situation or behaviour is.

There are no right or wrong answers.

Remember, circle the phrase that best describes how risky **you** think each situation or behaviour is.

1. Smoking	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
2. Roller blading	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
3. Drinking and driving	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
4. Parachuting	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
5. Speeding	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
6. Stealing cars and going for joy rides	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
7. Tao Kwon Do fighting	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
8. Underage drinking	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
9. Staying out late	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
10. Driving without a licence	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
11. Talking to strangers	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
12. Flying in a plane	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
13. Cheating	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
14. Getting drunk	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
15. Sniffing gas or glue	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
16. Having unprotected sex	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
17. Leaving school	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
18. Teasing and picking on people	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
19. Snow skiing	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
20. Taking drugs	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
21. Overeating	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky
22. Entering a competition	Extremely Risky	Very Risky	Risky	Not Very Risky	Not at all Risky

RISK BEHAVIOR QUESTIONNAIRE

Code Number: .....

Sex (Circle One): Male Female

Age (in years):.....

Date of Birth:_____/_____/_____
Day Month Year

School:.....

UNI Major:.....

UNI GPA: .....

DIRECTIONS

Below is written a list of behaviors which some people engage in. Read each one carefully and circle the phrase that best describes your behavior.

There are no right or wrong answers.

Remember, circle the phrase that best describes your behavior about each question in the list.

1. Smoking.....	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
2. Roller blading	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
3. Drinking and driving	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
4. Parachuting	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
5. Speeding	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
6. Stealing cars and going for joy rides	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
7. Tao Kwon Do fighting.....	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
8. Underage drinking	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
9. Staying out late	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
10. Driving without a licence	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
11. Talking to strangers	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
12. Flying in a plane	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
13. Cheating.....	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
14. Getting drunk.....	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
15. Sniffing gas or glue	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
16. Having unprotected sex	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
17. Leaving school.....	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
18. Teasing and picking on people	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
19. Snow skiing	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
20. Taking drugs.....	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
21. Overeating	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often
22. Entering a competition.....	Never Done	Hardly Ever Done	Done Sometimes	Done Often	Done Very Often

Scoring the ARQ

For Behavior, the lowest frequency of behavior is assigned a 0 and the highest a 4. For risk beliefs/ perception, the lowest risk judgment (i.e. not at all risky) is assigned a 0 and the highest a 4. Add up the ratings for all items, separately for each of the beliefs/perceptions and behaviors scales. This gives a total behavior score and a total beliefs/perceptions score. There are no reversed items.

For the factors (sub-scales) add up only those items in the factor. These are as follows:

Thrill-seeking (7 items): 2, 4, 7, 12, 17, 19, 22

Rebellious risk (5 items): 1, 8, 9, 14, 20

Reckless risk (5 items): 3, 5, 6, 10, 16

Anti-social risk (5 items): 11, 13, 15, 18, 21

To compare subscale scores with those obtained by Gullone, Moore, Moss & Boyd (2000), divide subscale total score by number of items in the subscale.

For reliability information, see Gullone, Moore, Moss & Boyd (2000), page 242.

APPENDIX B

INFORMED CONSENT DOCUMENTS

UNIVERSITY OF NORTHERN IOWA
HUMAN PARTICIPANTS REVIEW
INFORMED CONSENT

Project Title: Emotional Intelligence as a Protective Factor for Risk Behavior in Adolescence
Name of Investigator(s): Nicole Skaar

Invitation to Participate: You are invited to participate in a research project conducted through the University of Northern Iowa. The following information is provided to help you make an informed decision whether or not to participate.

Nature and Purpose: This study is designed to look at emotional intelligence in relation to risk behavior in adolescence and young adults. The current study compares emotional intelligence scores with personality traits, self-reported risk behavior and risk perception of adolescents and young adults.

Explanation of Procedures: We will ask for your participation this year and each year following for 5 years. Each session will last approximately 75 minutes. You will be contacted by a researcher to schedule your next session. The emotional intelligence measure, a personality inventory and the Adolescent Risk-taking Questionnaire will be given in group format with each group containing no more than 10 participants.

Discomfort and Risks: The risks of participation are minimal and include the possibility of boredom and frustration. Participants will be allowed to take breaks to help minimize these risks.

Benefits: There are no direct benefits to participation in this study; however, you will receive exposure to specific psychological measures that you may learn about in psychology classes.

Confidentiality: Information obtained during this study which could identify you will be kept confidential. The summarized findings with no identifying information may be published in an academic journal or presented at a scholarly conference. You may be assured that your name (and any other identifying information) will never be attached to the data.

Right to Refuse or Withdraw: Your participation is completely voluntary. You are free to withdraw from participation at any time or to choose not to participate at all. You will not be penalized or lose benefits to which you are otherwise entitled.

Questions: If you have questions about the study or desire information in the future regarding your participation or the study, you can contact Nicole Skaar at 319-721-5969 or the project investigator's faculty advisor John Williams at the Department of Psychology, University of Northern Iowa 319-273-6297. You can also contact the office of the Human Participants Coordinator, University of Northern Iowa, at 319-273-2748, for answers to questions about rights of research participants and the participant review process.

Agreement: I am fully aware of the nature and extent of my participation in this project as stated above and the possible risks arising from it. I hereby agree to participate in this project. I acknowledge that I have received a copy of this consent statement. I am 18 years of age or older.

_____ _____
(Signature of participant) **(Date)**

_____
(Printed name of participant)

_____ _____
(Signature of investigator) **(Date)**

_____ _____
(Signature of instructor/advisor) **(Date)**

UNIVERSITY OF NORTHERN IOWA
HUMAN PARTICIPANTS REVIEW
PARENTAL PERMISSION

Project Title: Emotional Intelligence as a Protective Factor for Risk Behavior in Adolescence
Name of Investigator(s): Nicole Skaar

Invitation to Participate: Your child has been invited to participate in a research project conducted through the University of Northern Iowa. The following information is provided to help you made an informed decision whether or not to participate.

Nature and Purpose: This study is designed to look at emotional intelligence in relation to risk behavior in adolescence and young adults. The current study compares emotional intelligence scores with personality traits, self-reported risk behavior and risk perception of adolescents and young adults.

Explanation of Procedures: We will ask for your child's participation this year and each year following for 5 years. Each session will last approximately 75 minutes. Your child will be contacted by a researcher to schedule the next sessions. The study will take place during study hall or during a class where the research topic complements course content. Students not choosing to participate will be given other class-related work by the instructor. The emotional intelligence measure, a personality inventory and the Adolescent Risk-taking Questionnaire will be given in group format with each group containing no more than 10 participants.

Discomfort and Risks: The risks of participation are minimal and include the possibility of boredom and frustration. Participants will be allowed to take breaks to help minimize these risks.

Benefits: There are no direct benefits to participation in this study; however, your child will receive exposure to specific psychological measures that he/she may learn about in psychology classes.

Confidentiality: Information obtained during this study that could identify your child will be kept confidential. The summarized findings with no identifying information may be published in an academic journal or presented at a scholarly conference. You may be assured that your child's name (and any other identifying information) will never be attached to the data.

Right to Refuse or Withdraw: Your child's participation is completely voluntary. He/she is free to withdraw from participation at any time or to choose not to participate at all, and will not be penalized or lose benefits to which he/she is otherwise entitled.

Questions: If you have questions about the study or desire information in the future regarding participation or the study, you can contact Nicole Skaar at 319-721-5969 or the project investigator's faculty advisor John Williams at the Department of Psychology, University of Northern Iowa 319-273-6297. You can also contact the office of the Human Participants Coordinator, University of Northern Iowa, at 319-273-2748, for answers to questions about rights of research participants and the participant review process.

Agreement: I am fully aware of the nature and extent of my child's participation in this project as stated above and the possible risks arising from it. I hereby agree to allow my son/daughter to participate in this project. I have received a copy of this form.

_____ _____
(Signature of parent/legal guardian) **(Date)**

_____
(Printed name of parent/legal guardian)

_____
(Printed name of child participant)

_____ _____
(Signature of investigator) **(Date)**

_____ _____
(Signature of instructor/advisor) **(Date)**

University of Northern Iowa
Human Participants Review
Informed Assent

Project Title: Emotional Intelligence as a Protective Factor for Risk Behavior in Adolescence
Name of Principal Investigator(s): Nicole Skaar

Invitation to Participate: You are invited to participate in a research project conducted through the University of Northern Iowa. The following information is provided to help you make an informed decision whether or not to participate.

Nature and Purpose: This study is designed to look at emotional intelligence in relation to risk behavior in adolescence and young adults. The current study compares emotional intelligence scores with personality traits, self-reported risk behavior and risk perception of adolescents and young adults.

Explanation of Procedures: We will ask for your participation this year and each year following for 5 years. Each session will last approximately 75 minutes. You will be contacted by a researcher to schedule your next sessions. The study will take place during study hall or during a class where the research topic complements course content. Students not choosing to participate will be given other class-related work by the instructor. The emotional intelligence measure, a personality inventory and the Adolescent Risk-taking Questionnaire will be given in group format with each group containing no more than 10 participants.

Discomfort and Risks: The risks of participation are minimal and include the possibility of boredom and frustration. Participants will be allowed to take breaks to help minimize these risks.

Benefits: There are no direct benefits to participation in this study; however, you will receive exposure to specific psychological measures that you may learn about in psychology classes.

Confidentiality: Information obtained during this study which could identify you will be kept confidential. The summarized findings with no identifying information may be published in an academic journal or presented at a scholarly conference. You may be assured that your name (and any other identifying information) will never be attached to the data.

Right to Refuse or Withdraw: Your participation is completely voluntary. You are free to withdraw from participation at any time or to choose not to participate at all. You will not be penalized or lose benefits to which you are otherwise entitled.

I, _____, have been told that one of my parents/guardians has given his/her permission for me to participate in a project about emotional intelligence and risk behaviors.

I understand that my participation is voluntary. I have been told that I can stop participating in this project at any time. If I choose to stop or decide that I don't want to participate in this project at all, nothing bad will happen to me.

_____ _____
Name Date